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BOTANICAL SERIES

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VOLUME XVIII

FLORA OF COSTA RICA

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PART II

BY

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PUBLICATION 392

CHICAGO, U.S.A.

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large and broad, crenate-dentate; fruits red or orange. A handsome shrub when covered with the fruits. The hairs are much more slender than those of *U. baccifera.*

Urera elata (Swartz) Griseb. *Ortiga. Urtica corallina* Liebm. Dansk. Vid. Selsk. Skrivt. V. 2: 295. 1851 (Aguacate, *Oersted*). *Urera corallina* Wedd. in DC. Prodr. 16, pt. 1: 90. 1869. Forests of the central region and the Pacific slope. Guatemala to Panama; Jamaica. A shrub 3–5 meters tall or larger; leaves large, crenate, the hairs few and slender.

Urera laciniata Wedd. *Ortiga.* Atlantic coast, and in Guanacaste. Ranging to Peru. A shrub of 1–4 meters; leaves deeply lobate; hairs thick and stinging very painfully. The species seems to be rather rare in Costa Rica but I have seen it in a few localities. The leaves are sometimes purple on the lower surface.

URTICA L. Nettle

Herbs with opposite, dentate leaves, furnished with slender, stinging hairs; flowers small, green, in spikes, panicles, or axillary glomerules, monoecious or dioecious.

Urtica chamaedryoides Pursh. *Chilacaste.* Forests and meadows of the volcanoes. A species of wide distribution in America.

Urtica copeyana Killip, sp. nov.—Caulis erectus simplex pilis albis brevibus reflexis pubescens et sparse setis gracilibus rectis armatus; stipulae deciduae; petioli 1.5–5.5 cm. longi minute pubescentes et sparse setosi; lamina ovata vel late ovato-lanceolata 6–11 cm. longa 4–8 cm. lata supra setis paucis laxis armata, subtus glabrescens, acuminata, basi cordata et 3–5-nervia, nervis conspicuis stramineis, glabra, margine grosse serrata, serraturis denticulatis 5 mm. latis; spicae graciles 3.5–5 cm. longae 2.5–3 mm. crassae, quoque nodo 3–5, simplices, rare basi ramosae, dense pubescentes, androgynae vel unisexuales; flores masculi non visi; flores feminei in glomerulos subcontiguos dispositi, perianthii segmentis exterioribus 0.7 mm. longis, interioribus orbicularibus 1 mm. longis latisque extus pilosulis; achaenium late ovatum.—Type in the U. S. National Herbarium, No. 799,382, collected along the shores of Río Pedregoso at El Copey, alt. 1,800 meters, February, 1898, *A. Tonduz 11929.*

Urtica nicaraguensis Liebm. *Ortiga.* Forests of the central mountains. Also in Nicaragua. The plant stings painfully.

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FLORA OF COSTA RICA

PAUL C. STANDLEY

PROTEACEAE. Protea Family

Trees or shrubs; leaves alternate, without stipules, simple or pinnate; flowers perfect, racemose; perianth 4-parted; stamens 4; fruit a follicle.—In Central America there are species of only the genera listed here. The family is best developed in Australia and South Africa.

15 Nov. 37 DR

GREVILLEA R. Br. Silk Oak

Grevillea robusta Cunningham. Planted as an ornamental tree in parks and streets. Native of Australia. A medium-sized tree, the leaves pinnate, the leaflets deeply divided into narrow segnents, silky beneath; flowers large, orange. In Central America this tree is known commonly by the name Grevilea or Gravilea. It has always seemed to me a singularly unattractive tree, perhaps in part because it grows in places where it becomes well covered with dust during the dry season.

PANOPSIS Salisb.

The other species of the genus are South American.

Panopsis costaricensis Standl. Journ. Wash. Acad. Sci. 17: 164. 1927. *Papa, Palo papa.* Cerros de Santiago, near San Ramón, *Brenes 14303.* Slopes of Volcán de Poás, 1,600 meters; frequent in the region of San Ramón. Also in Panama. A tree of 5–10 meters; leaves almost sessile, oblong or obovate, entire, glabrous; flowers whitish, the racemes forming a terminal panicle; fruit 4.5 cm. long, hard and woody.

ROUPALA Aubl.

Trees or shrubs; leaves entire or dentate, those of sterile branches often or usually pinnate; flowers small, in terminal or axillary racemes; fruit a more or less oblique and 2-celled capsule, the seeds winged.—These trees are noteworthy for their dimorphous leaves, both simple and pinnate ones growing sometimes from the same branch. The wood is hard and heavy. All parts of the plant, when cut, exhale a strong skunk odor. The genus ranges northward to Mexico, and southward far into South America, where the

species are more numerous, but no better differentiated than the Central American ones.

Roupala complicata HBK. *Danto, Ratón, Danto hediondo, Ratoncillo.* *R. Martii* var. *simplicifolia* Meisn. in Mart. Fl. Bras. 5, pt. 1: 87. 1855, ex parte (Costa Rica, *Warscewicz*). Pacific slope; San Ramón, at 1,100 meters. Ranging to Venezuela. A medium-sized tree; leaves usually entire, ovate, 3–7 cm. long; racemes tomentose.

Roupala darienensis Pittier. *Ratoncillo, Zorrillo, Danto hediondo.* Pacific slope, at 1,000 meters or less. Also in Panama. A small tree, or sometimes attaining a height of 30 meters; leaves serrate; racemes tomentose. Too closely related to *R. complicata* and perhaps not distinct. All the Central American species are much alike, and it may well be that all are merely forms of a single variable species.

Roupala glaberrima Pittier, Contr. U. S. Nat. Herb. 18; 229. 1917. *Zorrillo blanco, Danto hediondo.* Río Ciruelas, above Barba, *Tonduz 2228.* Forests of the central mountains. Endemic. A tree of 5–8 meters, the bark gray, smooth; leaves entire or somewhat dentate; racemes glabrous.

LORANTHACEAE. Mistletoe Family

Parasitic shrubs, rarely trees; leaves usually opposite, entire, thick, sometimes reduced to scales, without stipules; flowers regular, perfect or unisexual, large or almost minute; perianth simple or double; petals 3–6 or none; stamens as many as the petals or perianth segments; fruit a berry or drupe, with a single seed, usually very viscid and sticky.—All the genera known from Central America occur in Costa Rica. These plants are the only true parasites found on trees in Costa Rica, other plants seen on trees being epiphytes. Parasites are organically united with the tree upon which they grow, obtaining their nutriment directly from it. Epiphytes are connected with the tree merely by adherent roots, and extract their nutriment from the air or from dust and decaying leaves that lodge about their roots. The mistletoe (*liga* or *visco*) of Spain is a species of *Viscum*, a genus of this family.

ANTIDAPHNE Poepp. & Endl.

A single species occurs in Central America, the others being South American.

Antidaphne viscoidea Poepp. & Endl. *Matapalo.* Cantón de Dota and region of Cartago, 1,400–1,800 meters. Ranging to

Peru. A parasitic shrub 30–90 cm. high; leaves alternate, obovate, 2.5–7 cm. long, rounded at the apex; flowers yellowish, in short, conspicuously bracted spikes, the bracts scarious and imbricate. Growing usually, perhaps always, on *Quercus*.

DENDROPHTHORA Eichl.

Small parasites; leaves normal or reduced to scales; flowers minute, dioecious or monoecious, sunk in the rachis, disposed in short spikes; perianth 3-parted.—Only the following species are known from Central America. The species with normal leaves are similar in appearance to *Phoradendron*.

Dendrophthora biserrula Eichl. Common on slopes of the volcanoes and mountains of the central region, at 2,000–3,150 meters. Guatemala to Colombia. Plants much branched, only 10–25 cm. high, the leaves reduced to scales; berries white. This species probably is not distinct from *D. squamigera* (Benth.) Kuntze of Colombia.

Dendrophthora costaricensis Urban, Ber. Deutsch. Bot. Gesell. 14: 285. 1896. Volcán de Irazú, *Hoffmann*, and *Wendland 706*. Also in Panama. Growing upon *Quercus* and *Myrica*. Leaves obovate or rounded, 1.5–3 cm. long, rounded at the apex, glabrous. This plant has been reported from Costa Rica under the name *Phoradendron flavescens*.

GAIADENDRON G. Don

The other species of the genus are South American, growing chiefly in the Andean regions.

Gaiadendron poasense Donn. Smith, Bot. Gaz. 56: 61. 1913. Shore of the lake of Volcán de Poás, 2,600 meters, *Pittier 814*. Common in forests of the central mountains, 1,500–2,700 meters. Endemic. A shrub or tree of 3–6 meters, glabrous; leaves petiolate, elliptic, 4–7 cm. long, acute; flowers yellow, 13 mm. long, in bracteate racemes; berries yellow. A rather ornamental and showy tree because of its large and brilliantly colored flowers.

ORYCTANTHUS Eichl.

Parasitic shrubs, the leaves well developed, palmately nerved; flowers usually perfect, spicate, sunk in the rachis; petals 3, small; berries oblong.—The following species are the only ones known from Central America.

Oryctanthus cordifolius (Presl) Urban. Atlantic coast, growing upon cacao and probably other trees. Widely distributed in

tropical America. Leaves sessile, cordate at the base, broadly ovate, very thick and hard.

Oryctanthus occidentalis (L.) Eichl. Region of Cartago, growing upon *Zanthoxylum* and probably other genera. A species of wide distribution. Leaves short-petiolate, oval or ovate, obtuse or rounded at the apex; flowers perpendicular to the rachis.

Oryctanthus spicatus (Jacq.) Eichl. *Matapalo.* Atlantic coast and region of Dota; San Ramón; at 1,800 meters or less, growing upon cacao and other trees. Guatemala to northern South America. Leaves short-petiolate, ovate or oval, rounded at the apex; flowers oblique to the rachis.

PHORADENDRON Nutt.

Reference: William Trelease, The genus *Phoradendron*, 1916.

Parasitic shrubs, the leaves well developed (in the Central American species); flowers dioecious or monoecious, 3-parted, spicate, sunk in the rachis of the spike, green and minute; fruit a small berry. —From Central America about 25 species are known.

Phoradendron annulatum Oliver, Vid. Medd. Kjoebenhavn 1864: 176. 1865. Type collected in Costa Rica by Oersted, the exact locality unknown. Also in Guatemala. Illustrated, Trelease, Gen. Phorad. *pl. 65.*

Phoradendron ceibanum Trelease, Gen. Phorad. 111. *pl. 159.* 1916. *Matapalo.* Río Ceiba, Buenos Aires, *Pittier 3900.* Also in Cantón de Dota. Extending to British Honduras. Ascending in Costa Rica to an elevation of 2,000 meters.

Phoradendron Cooperi Trelease, Gen. Phorad. 67. *pl. 83.* 1916. *Matapalo.* La Estrella de Cartago, *Cooper 5931.* Common in the central region, 1,100–1,800 meters. Endemic. Whole plant yellowish green; leaves elongate, very narrow. Probably not distinct from *P. Tonduzii,* published on the same page.

Phoradendron corynarthron Eichl. *Matapalo.* Mountains of Guanacaste, 500–700 meters. Also in Panama.

Phoradendron crassifolium (Pohl) Eichl. *Matapalo.* Atlantic slope, 900–2,400 meters. Guatemala to South America.

Phoradendron crispum Trelease, Gen. Phorad. 77. *pl. 99.* 1916. Volcán de Irazú, *Pittier 14117.* Common in mountains of

the central region, 1,800–3,000 meters. Endemic. Leaves rounded-obovate, 3–5 cm. long; berries white, translucent. Growing upon *Quercus, Vaccinium*, etc.

Phoradendron Dodgei Trelease, sp. nov.—*Aequitoriales-Corynarthrae.* Vix furcata, ramis subgracilibus cataphyllis basalibus tantum onustis, androgyna(?), internodiis breviusculis (20–40 vel ad 50 mm. longis, 1–3 mm. crassis) transiente ancipitibus; cataphylla 1 vel interdum 2 paria vix tubulosa; folia plus minusve falcate lanceolata firma sed manifeste graciliter circiter 5-nervia, anguste obtusa, 4–6 cm. longa 1–2 cm. lata, acute circiter 10 mm. longe subpetiolata; spicae solitariae modicae (ad 30 mm. longae), articulis 2–3 fusiformi-oblongis 4-seriatim 16–20-floris, pedunculo vix 5 mm. longo; squamae vix ciliatae; fructus globosus paullo granulosus 3 mm. diam., sepalis arcte inflexis.—Gorge below Tilarán, Guanacaste, *C. W. Dodge 6200* in 1930 (type in Gray Herb.).

Phoradendron falcifolium Trelease. *Matapalo.* Mountains of Guanacaste. Also in Guatemala. Probably only a form of *P. robustissimum.*

Phoradendron gracilispicum Trelease, Gen. Phorad. 130. *pl. 192.* 1916. *Matapalo. P. Heydeanum* f. *australe* Trel. op. cit. 135. Common in the central region, at 600–1,800 meters, growing on *Erythrina, Psidium, Quercus*, etc. Also in Colombia and Venezuela. Berries white, translucent.

Phoradendron paquitanum Trelease, sp. nov.—*Aequitoriales-Quadrangulares.* Plus minusve pseudo-dichotoma, ramis sublongis cataphyllis basalibus tantum onustis, androgyna(?), internodiis breviusculis (30–40 mm. longis 2–4 mm. crassis) minute granulosis 4-alatis superne aliquanto ancipitibus; par cataphyllorum 1 fere basilare; folia subelliptico-oblonga obtusa 5–6 cm. longa 1.5–2 cm. lata circiter 5 mm. longe petiolata; spicae solitariae vel fasciculatae modicae (in statu fructifero circiter 30 mm. longae), articulis circiter 3 et 4+2-seriatim 20-floris, pedunculo 5 mm. longo; fructus globosus 3 mm. diam. minute celluloso-papillosus, sepalis arcte inflexis.—Río Paquita, Prov. San José, *Dodge & Goerger 9879* (type in herb. Mo. Bot. Gard.).

Phoradendron piperoides (HBK.) Trelease. *Matapalo. P. Biolleyi* Krause, Notizbl. Bot. Gart. Berlin 5: 264. 1912 (San Mateo, *Biolley*). Tierra caliente, ascending to the region of Cartago. A species of wide distribution in tropical America.

Phoradendron quinquenervium Krause, Notizbl. Bot. Gart. Berlin 5: 264. 1912. *Matapalo.* Tuis, *Tonduz 11457.* Cantón de Dota and mountains of the Meseta Central, ascending to 1,800 meters. Endemic. Plant yellowish green. Illustrated, Trelease, Gen Phorad. *pl. 231b.*

Phoradendron Rensoni Trelease. *Matapalo.* Guanacaste and Pacific coast, ascending to the Meseta Central. Ranging to southern Mexico. Growing upon *Guazuma* and other trees.

Phoradendron robustissimum Eichl. *Matapalo. P. robustissimum* var. *simulans* Trelease, Gen. Phorad. 78. *pl. 102.* 1916. Common on the Pacific coast, ascending to Cantón de Dota and the region of Cartago. Ranging to Campeche. The plant is noteworthy for its very thick leaves.

Phoradendron supravenulosum Trelease, Gen. Phorad. 154. *pl. 232.* 1916. *Matapalo.* Region of Dota and Cartago, and in Guanacaste. Ranging to Guatemala. Scarcely more than a form of *P. quinquenervium.*

Phoradendron Tonduzii Trelease, Gen. Phorad. 67. *pl. 82.* 1916. Santa Rosa del Copey, *Tonduz 12179. Matapalo.* Common in the central region, 1,100–1,800 meters. Also in Panama. Upon *Quercus* and other trees. Plants pendent, yellowish green; berries white.

PHTHIRUSA Mart.

One other Central American species occurs in Panama.

Phthirusa pyrifolia (HBK.) Eichl. *Matapalo.* Common on the coasts, ascending to the Meseta Central; region of San Ramón. Guatemala to South America. Growing in Costa Rica upon *Citrus, Theobroma, Croton,* and other trees. A species of wide distribution. A shrub 0.5–1.5 meters high or even larger, the branches elongate and sometimes pendent; leaves ovate to oblong, rounded at the apex; flowers minute, in groups of 3, spicate, green; berries oblong.

PSITTACANTHUS Mart.

Parasitic shrubs, the leaves well developed; flowers perfect, large, generally 6-parted, arranged in racemes or corymbs; fruit a large berry.—Because of their large and brightly colored flowers, these plants are very showy. Sometimes they grow in such abundance on tall trees that when they are in flower it looks as if the tree itself was in blossom. When they become too plentiful upon a tree they

sap its strength and finally kill it. It is these plants that are responsible for the *flores de palo* that are well known in some parts of Central America. They are scars left upon a tree branch when the parasite has been separated by force from it.

Psittacanthus americanus (L.) Mart. *Matapalo.* Common in the central region, growing on *Quercus* and other trees. A species of wide distribution. A glabrous shrub 1 meter high or less; leaves oblong or elliptic, rounded or very obtuse at the apex; flowers 3–5 cm. long; berries almost black.

Psittacanthus calyculatus (DC.) Don. Region of Dota, and probably elsewhere. Ranging to Mexico. Leaves lanceolate, attenuate to the apex; flowers 3–5 cm. long.

Psittacanthus Schiedeanus (Schlecht. & Cham.) Blume. *Matapalo.* Slopes of the volcanoes, at 1,500–2,400 meters, and probably in regions of less elevation. Extending to Mexico. Leaves lanceolate or ovate; flowers 6.5–8 cm. long.

STRUTHANTHUS Mart.

Parasitic shrubs, often more or less scandent, glabrous; leaves well developed; flowers small, in groups of 3, spicate, racemose, or corymbose; fruit a small berry.

Struthanthus costaricensis Standl. Field Mus. Bot. 4: 202. 1929. Forests of Tuis, 650 meters, *Tonduz 11458.* Also in Guanacaste and Cantón de Dota, 500–1,800 meters. Endemic. Leaves elliptic or obovate, acute or obtuse; flowers sessile, the glomerules also sessile.

Struthanthus marginatus (Desr.) Blume. *Matapalo. Loranthus cansjeraefolius* Oliver, Nat. For. Kjoebenhavn Vid. Medd. 1864: 163. 1865 (Agua Caliente, *Oersted*). *S. Woodsonii* Cufodontis, Archivio Bot. 10: 7. 1934 (La Castilla to Los Negritos, Río Reventazón, *Cufodontis 331*). Common throughout the central region and the Atlantic slope, to the coast; region of San Ramón; growing upon *Quercus, Coffea,* and other trees. Guatemala to South America. Often scandent, the leaves lanceolate or ovate, acuminate; flowers sessile, the glomerules pedicellate. It is possible that the plant to which the name *S. Woodsonii* has been given is distinct from *S. marginatus* of Brazil, but it seems to me that all the numerous Costa Rican specimens represent a single species.

Struthanthus Oerstedii (Oliver) Standl. *Matapalo.* Guanacaste; region of San Ramón; 600–1,200 meters. Ranging to Salvador. Leaves obovate, obtuse; flowers sessile, the glomerules pedicellate.

Struthanthus orbicularis (HBK.) Blume. *Matapalo.* Common in the Meseta Central, and probably elsewhere, growing upon *Citrus* and other trees. A species of wide distribution. Leaves rounded; flowers short-pedicellate.

Struthanthus polystachyus (Ruiz & Pavón) Blume. On the coasts. Extending to South America. Leaves lance-oblong; flowers sessile, the glomerules also sessile.

OLACACEAE

Shrubs or trees, sometimes armed with spines; leaves alternate, entire, without stipules; flowers small, regular, perfect or polygamous, axillary; calyx 4–6-dentate or 4–6-parted; corolla 4–6-lobate or of 4–6 petals; stamens as many as the corolla segments; ovary 1–3-celled, partly or completely inferior, the ovules few; fruit a 1-celled drupe.

HEISTERIA Jacq.

Glabrous shrubs or small trees; leaves short-petiolate; flowers solitary or fasciculate in the leaf axils, small; calyx at first small, in fruit much enlarged and rotate, entire or lobate, red; drupe small, white or black.—Six species are known from Central America.

Heisteria concinna Standl. *Naranjillo.* Dry forests of Guanacaste, 600 meters; Río Jarís. Also in Chiriquí, Panama. A tree of 6–9 meters with dense, rounded crown and smooth bark; leaves coriaceous, elliptic-oblong; calyx deeply lobate; drupes white.

Heisteria costaricensis Donn. Smith, Bot. Gaz. 19: 255. 1894. Río Reventazón, Prov. Cartago, 600 meters, *J. D. Smith 4760.* Forests of the Atlantic coast; region of San Ramón, at 1,100 meters. Panama. A shrub or small tree; leaves linear-lanceolate; pedicels 1–1.5 cm. long; flowers white; drupes black.

Heisteria longipes Standl. Forests of the Atlantic coast. A shrub or tree of 2–6 meters; leaves oblong or elliptic; pedicels longer than the fruiting calyx (shorter in the other species listed here). Also in Panama.

Heisteria macrophylla Oerst. *Manglillo.* Common in forests of the Atlantic coast; region of San Ramón, at 1,075 meters. Ranging

to Guatemala. A shrub or tree, sometimes 10 meters high; leaves oblong-lanceolate, acuminate; calyx red; drupes black. For the genus *Heisteria* there have been reported the following Indian names; Srot-kra (Brunka); Trár-kro (Térraba). The shrubs are conspicuous in the forests of the tierra caliente because of the bright color of the fruiting calyces.

MINQUARTIA Aubl. Manwood

Minquartia guianensis Aubl. *Manú.* Forests of the Atlantic coast; Golfo Dulce. Ranging to Brazil. A tall tree; leaves oblong or oblong-ovate, acute, short-petiolate; flowers very small, in paniculate racemes. The wood is hard, heavy, grayish brown, and very durable. It is well known in the tierra caliente, where it is utilized for various purposes. In Panama the tree is known by the names Níspero negro, Palo criollo and Urodibe.

SCHOEPFIA Schreb.

One other species is known from Central America.

Schoepfia vacciniiflora Planch. In forest, San Pedro de San Ramón, 850 meters, *Brenes 3554.* Also in Guatemala and probably in Panama. A small tree, glabrous; leaves coriaceous, lance-oblong, long-acuminate; flowers in short, mostly 3-flowered, axillary racemes, the calyx small and cupular; corolla white, 5 mm. long, the lobes shorter than the tube.

XIMENIA L.

In Central America the genus is represented by a single species.

Ximenia americana L. *Pepenance.* Thickets of the coasts, often growing on sea beaches. A species of wide distribution in both hemispheres. A shrub or small tree, armed with sharp spines, the bark reddish; leaves oblong to elliptic, rounded at the apex; flowers fragrant, white, the corolla densely barbate within; drupe yellow or orange, 1.5 cm. long. The fruit is acid and edible but of very inferior quality. The wood is strong, hard, and heavy. The Brunka name of Tsu-krá is cited for the plant.

BALANOPHORACEAE

Fleshy herbs, in general appearance resembling mushrooms, parasitic upon the roots of other plants, without any green coloration, the rhizomes tuberous; leaves none or reduced to scales, the peduncle short or elongate; flowers very small, unisexual, inserted upon a thick spadix.—In Central America there have been found only the species listed here.

CORYNAEA Hook.

The other species of the genus are South American.

Corynaea crassa Hook. f. Trans. Linn. Soc. 22: 54. *pl. 13.* 1856. Collected on the Volcán de Barba by Wendland. Also in Colombia. Plants glabrous, the rhizome as large as a man's head; peduncle 8–20 cm. long, the spadix 6–10 cm. long. In Colombia the plants are known by the name Orejas de palo.

HELOSIS L. Rich.

The other species of the genus are South American and West Indian.

Helosis mexicana Liebm. Reported from El General and elsewhere. Mexico to Colombia. Plants glabrous, the peduncle 6–24 cm. long; spadix 1.5–4.5 cm. long. The plants form dense clumps and grow in dark forest among rotting leaves.

LANGSDORFFIA Mart.

A single species occurs in Central America.

Langsdorffia hypogaea Mart. In forest near Santa María de Dota, 1,500 meters, *M. Valerio 1381.* Mexico to Brazil. Plants forming small, dense clumps, scarcely projecting above the surface of the soil, from thick, branched rhizomes; peduncle short, densely covered with narrow, hard, closely imbricate scales that conceal most of the short spadix, which sometimes is expanded and disk-like.

ARISTOLOCHIACEAE. Birthwort Family

Reference: O. C. Schmidt, Die Gattung *Aristolochia* in Costa Rica, Repert. Sp. Nov. 23: 284. 1927.

In Central America the family is represented by a single genus.

ARISTOLOCHIA L.

Erect or scandent perennials, herbaceous or woody; leaves alternate, entire or lobate; flowers perfect, very irregular; calyx more or less united with the ovary, inflated near its base and contracted above, the blade plane or reflexed, entire or lobate; corolla none; fruit a 6-valvate capsule containing numerous seeds.—About a dozen species are known from Central America.

Aristolochia anguicida L. Pacific slope, in dry thickets. Mexico to the West Indies. A scandent herb with large, green stipules; leaves triangular or ovate, deeply cordate at the base;

calyx 4 cm. long, the blade linear-lanceolate. Easy of recognition because of the large stipules (really pseudostipules, as in other species).

Aristolochia costaricensis (Klotzsch) Duchartre in DC. Prodr. 15, pt. 1: 450. 1864. *Howardia costaricensis* Klotzsch, Monatsber. Akad. Berlin 614. 1859. Lepanto, *Hoffmann 284*. I have seen no material of this species, which must be close to *A. pilosa*, from which it differs in having oblong leaves. The var. *zamorensis* Hieron. is reported from the region of San Ramón, *Brenes 14293*, and occurs also in Ecuador.

Aristolochia grandiflora Swartz. Common on the Atlantic coast, occurring also on the Pacific; Guanacaste. Mexico to Panama and West Indies. A large, herbaceous vine; leaves ovate-cordate, almost glabrous; calyx 12–20 cm. long, provided at the apex of the blade with a linear appendage as much as 1 meter long. The flower is the largest produced by any Central American plant, and one of the largest flowers of the whole world, its main portion being about the size and shape of a duck. It has a highly offensive odor, suggestive of carrion, and is dark purple within. The plant is often cultivated in northern hothouses. In other parts of Central America it bears such names as Flor de pato, Guaco, and Chompipe. It is celebrated locally for supposed medicinal properties, especially as a remedy for snake bites. The roots are said to be poisonous to pigs and other animals.

Aristolochia loriflora Masters. Nicoya and Río Grande in the region of San Ramón. Guatemala to Colombia. Plants almost glabrous; leaves ovate-cordate; calyx 3–3.5 cm. long, the blade acute; capsule 3.5 cm. long.

Aristolochia maxima L. *Cuajilote* (Pittier), *Carraquito*. *Howardia Hoffmanni* Klotzsch, Monatsber. Akad. Berlin 621. 1859 (Costa Rica, *Hoffmann*); *A. maxima* var. *angustifolia* Duch. in DC. Prodr. 15, pt. 1: 457. 1864. Common in forest and thickets of the coasts, ascending almost to the Meseta Central. Mexico to South America. A more or less woody vine; leaves oblong, rounded or somewhat cordate at the base, pubescent beneath; calyx 8–10 cm. long. Pittier states that the young, tender fruits are edible.

Aristolochia odoratissima L. *Flor de pascua*. Atlantic coast. A species of wide distribution. A herbaceous vine, almost glabrous;

leaves triangular-cordate; calyx 6–11 cm. long, the blade rounded at the apex.

Aristolochia pandurata Jacq. Imperfect specimens collected in Costa Rica are perhaps referable to this South American species. Leaves trilobate, the lobes narrow.

Aristolochia pilosa HBK. *A. pilosa* var. *ligulifera* Masters, Bot. Gaz. 33: 256. 1902. Common in the tierra caliente. A species of wide distribution. A scandent herb, densely hirsute with brown hairs; leaves ovate-cordate; calyx 5–7 cm. long. Easy of recognition because of the abundant, brown pubescence.

Aristolochia ringens Vahl. Reported as in cultivation at San José. Central America and West Indies. A large vine with conspicuous stipules; leaves rounded-cordate, large, broadly rounded at the apex, almost or quite glabrous; flowers very large, the calyx deeply bilabiate.

Aristolochia securidata Masters in Donn. Smith, Bot. Gaz. 33: 256. 1902. *Canastilla.* Rosario, Llanuras de Santa Clara, 300 meters, *Pittier 7604.* Plains of the Atlantic coast. Endemic. A scandent herb; leaves cordate, almost glabrous; calyx 4 cm. long, the blade subobtuse; capsule 2.5 cm. long.

Aristolochia sylvicola Standl. Río Changuinola, and probably in other parts of the Atlantic coast. Panama. A scandent shrub, the stems covered with thick, deeply ridged, cork-like bark; leaves large, narrowly ovate, tomentose and pale beneath.

Aristolochia Tonduzii O. C. Schmidt, Repert. Sp. Nov. 23: 284. 1927. Forests of Trejos, Las Vueltas, Tucurrique, 700 meters, *Tonduz 13175.* Reported also as in cultivation at San José. Endemic. Stems scandent, short-pilose like all younger parts of the plant; leaves elliptic, cordate at the base, acuminate; flowers in few-flowered inflorescences; limb of the calyx lanceolate, 4–5 cm. long, 1.5 cm. wide.

Aristolochia trilobata L. Atlantic coast. A species of wide distribution. Leaves 3-lobate, the lobes obtuse; flowers very large, the blade ovate, with a narrow terminal appendage 12–15 cm. long.

Aristolochia veraguensis Duch. in DC. Prodr. 15, pt. 1: 458. 1864. Type collected by Warscewicz in Costa Rica or Panama. Leaves glabrous, broadly ovate, deeply cordate at the base; calyx about 7 cm. long.

POLYGONACEAE. Smartweed Family

Herbs, shrubs, or trees, sometimes scandent; leaves alternate, entire, the petioles generally dilated at the base; stipules (ocreae) usually scarious and sheath-like; flowers perfect or unisexual, regular, commonly small, the pedicels almost always articulate; perianth green or variously colored, of 4–6 lobes or segments; stamens 5–9 or numerous; ovary superior, 1-celled, 1-ovulate; fruit an achene, the perianth sometimes persistent and fleshy in fruit.—Other genera are represented in northern Central America.

ANTIGONON Endl.

Another species occurs in northern Central America.

Antigonon leptopus Hook. & Arn. *Bellísima.* Cultivated for ornament in gardens, and probably naturalized in some localities, but I believe it is not native in Costa Rica. Probably indigenous in Mexico and northern Central America. A herbaceous or somewhat woody vine; leaves cordate, pubescent or almost glabrous; flowers pink, in paniculate racemes, the racemes terminated by a tendril. A showy and handsome plant, cultivated in almost all tropical regions.

COCCOLOBA L.

Reference: Lindau, Monographia generis Coccolobae, Bot. Jahrb. 13: 106–229. 1890.

Trees or shrubs; leaves petiolate; flowers perfect, in spikes or racemes; perianth 5-lobate, accrescent and enclosing the fruit, sometimes very juicy.—About 20 species are known from Central America.

Coccoloba acuminata HBK. Thickets of the Pacific coast, probably also of the Atlantic. Guatemala to South America. A shrub or a tree of 6 meters; leaves oblong-lanceolate, 10–20 cm. long, acuminate, almost glabrous; fruits red. A very showy plant when in fruit. In Nicaragua it is known by the name Papaturrillo.

Coccoloba caracasana Meissn. *Papaturro blanco.* Pacific coast. Central America to Venezuela. A tree of 20 meters or less; leaves oval or rounded, 10–30 cm. long, rounded at the apex, almost glabrous; fruits almost sessile, white. The very juicy fruits have a somewhat acid and agreeable flavor and are edible.

Coccoloba changuinolana Standl. Field Mus. Bot. 8: 9. 1930. Río Changuinola, Costa Rica and Panama; region of San Ramón,

at 1,100 meters. A tree of 9 meters or less; leaves oval or elliptic, 12–20 cm. long, rounded and abruptly short-acuminate at the apex, glabrous; pedicels very short.

Coccoloba floribunda (Benth.) Lindau. *Papaturro.* Thickets of the Pacific coast, common in many places. Guatemala to Brazil. A tree of 6 meters or less in height with rounded crown; leaves obovate, rounded or obtuse at the apex, barbate beneath along the costa; flowers almost sessile; fruits white.

Coccoloba padiformis Meissn. Golfo Dulce. Also in Venezuela. Leaves oblong, coriaceous, 10–20 cm. long, glabrous, acute; pedicels 2–3 mm. long.

Coccoloba Uvifera (L.) Jacq. *Uva de playa, Papaturro.* Common on sea beaches. A species of wide distribution, ranging from Florida to northern South America. A shrub or small tree with very dense foliage, the bark smooth, cinnamon-colored; leaves rounded, 8–20 cm. wide, very thick, glabrous, often tinged with red; flowers small, whitish, very fragrant; fruits as much as 2 cm. long, purple. A characteristic species of tropical beaches, and confined to such places; a handsome shrub, sometimes cultivated for ornament. The wood is hard and compact, dark brown, and heavy. It is reported to yield a red dye. The fruits are edible. The Guatuso name of Kan-ikán is reported.

Coccoloba Wercklei Standl. Field Mus. Bot. 4: 304. 1929. *Carro caliente.* El Coyolar, 150 meters, *Wercklé.* Pacific slope. Endemic. A glabrous tree; leaves rounded or oval, 7–10 cm. long, rounded and short-acuminate at the apex; pedicels longer than the fruits.

MUEHLENBECKIA Meissn.

Muehlenbeckia platyclada Meissn. *Solitaria.* An ornamental plant of gardens. Native of the Pacific islands. Plants leafless, the stems compressed and broad, ribbon-like, articulate, with minute flowers on the margins.

Muehlenbeckia tamnifolia (HBK.) Meissn. *Bejuco colorado.* Abundant in forests of the central region, 1,600–3,000 meters. Mexico to Bolivia. Plants herbaceous, usually epiphytic, scandent, the stems often greatly elongate and forming dense masses over low trees; leaves oblong to elliptic, 4–10 cm. long, glabrous, acute, usually hastate-cordate at the base; flowers small, green, racemose; achene enclosed in the fleshy calyx. Another Central American species is found on the volcanoes of Guatemala.

POLYGONUM L. Smartweed

Herbs with narrow leaves; flowers small, green or variously colored, in spikes or racemes, the sepals not winged; stamens 3–9; fruit a small achene.—A large genus, but with only seven species in Central America.

Polygonum acuminatum HBK. Swampy places of the Atlantic coast. A species of wide distribution. Plants 1 meter high; ocreae with long setae on the margin; leaves linear-lanceolate, densely strigose on the lower surface; racemes dense, 4–10 cm. long, the flowers white or pink.

Polygonum Meisnerianum Cham. & Schlecht. Reported for Costa Rica, without indication of the locality. A species of wide distribution. Plants somewhat scandent; leaves linear, more or less cordate at the base; racemes only 1 cm. long, the flowers pink.

Polygonum persicarioides HBK. *Chile de perro.* Swampy places of the Atlantic coast. A species of wide distribution. Leaves linear-lanceolate, almost glabrous; racemes dense; calyx pink, not punctate.

Polygonum punctatum Ell. *Chile de perro. P. acre* HBK. Common in moist or wet places, Meseta Central to the coasts. A widely distributed species. Leaves lanceolate, glabrous; racemes interrupted, slender, 2–6 cm. long; calyx green or pink, punctate; achene black, lustrous.

RUMEX L.

Perennial herbs; leaves entire or undulate, somewhat succulent; flowers small, green or reddish, perfect or unisexual, racemose; sepals 6, the inner ones usually winged or tuberculate; fruit a 3-angled achene.—From Central America only the species listed here are known.

Rumex Acetosella L. *Ruibarbillo.* Abundant in meadows of the volcanoes and Cerro de Las Vueltas, 1,800–3,000 meters. Native of Europe and Asia, naturalized in many parts of the New World; imported into Costa Rica with grass seeds. Plants 10–30 cm. high, the small leaves hastate; flowers dioecious, green or reddish. The leaves have an acid flavor.

Rumex costaricensis Rechinger, Repert. Sp. Nov. 40: 300. 1936. Cerro de La Muerte, 3,000 meters, *Stork 3043.* Known also from Cerro de Las Vueltas, at the same elevation. Endemic. A giant herb, often 5–6 meters high, the stems as much as 10 cm.

thick, hollow; leaves oblong-ovate. A strange plant to one familiar only with the low species of temperate regions, tree-like in habit and probably the largest plant of the genus, at least in America. On Cerro de Las Vueltas it forms dense thickets in places protected from the wind.

Rumex crispus L. Common in the vicinity of San José, and probably also elsewhere. A European species, naturalized in many parts of America. Plants perennial from a large, thick, yellow root, 50–100 cm. high; leaves oblong, crispate; flowers green. In the United States the leaves often are cooked and eaten like spinach.

Rumex obtusifolius L. *Ruibarbo.* Swampy places of the Meseta Central, and in meadows of the volcanoes. A European species, naturalized in many parts of America. Similar to *R. crispus*, but the leaves much broader, and not crispate.

RUPRECHTIA C. A. Mey.

Another Central American species grows in Guatemala.

Ruprechtia Cumingii Meissn. Nicoya. Colombia to southern Mexico. A small or medium-sized tree; leaves short-petiolate, ovate, 4–7 cm. long, acute, almost glabrous; flowers dioecious, the racemes short and dense; stamens numerous; segments of the pistillate calyx enlarged in fruit and red.

TRIPLARIS L.

A single species occurs in Central America, the other members of the genus being South American.

Triplaris americana L. *Hormigo, Tabacón, Tabaco, Tabaco de monte.* Common in the tierra caliente. Mexico to South America. A medium-sized or rather large tree with rounded crown; leaves oblong, 17–35 cm. long, acute, pubescent or almost glabrous; flowers dioecious, green, the racemes arranged in dense panicles; stamens 9; pistillate calyx enlarged in fruit, the outer sepals 5 cm. long, oblong-spatulate, red or purple. From Central America several species have been reported or described but all the specimens seem to me to represent a single, not very variable species. When in fruit this tree is one of the most showy of Central America, especially when it forms dense and almost pure stands over considerable areas of the plains. The wood is used for construction in some regions; it is fine-grained, heavy, and white. The branches always are infested with small ants that bite painfully. The fruit is curious, an achene surrounded by 3 large, wing-like sepals. When it falls from the

tree it descends slowly, like a parachute, whirling about and often coming to rest at some distance from the tree.

CHENOPODIACEAE. Pigweed Family

Reference: Standley, Chenopodiaceae, N. Amer. Flora 21: 3–93. 1916.

BETA L. Beet

Beta vulgaris L. *Remolacha.* Cultivated commonly for its edible roots. Native of Europe.

CHENOPODIUM L.

In Central America there is a single native species, in Guatemala.

Chenopodium ambrosioides L. *Apazote.* Vicinity of San José and doubtless in many other places; often planted in gardens. An American plant but scarcely native in Costa Rica. Perhaps indigenous in Mexico, but in all parts of its range the plant behaves as an introduced rather than a native species. An annual or perennial with a strong and offensive odor; leaves oblong or lanceolate, dentate or entire, alternate; flowers minute, green, in dense glomerules. The plant is employed commonly as a remedy for intestinal parasites in man, and the seeds are an official drug in many pharmacopoeias. It grows in almost all parts of tropical America, as well as the United States, and has become naturalized in the Old World.

SPINACIA L. Spinach

Spinacia oleracea L. *Espinaca.* A plant of European origin, cultivated commonly in gardens for its edible leaves.

AMARANTHACEAE. Amaranth Family

Reference: Standley, Amaranthaceae, N. Amer. Flora 21: 95–169. 1917.

Herbs or shrubs, rarely small trees, sometimes scandent; leaves opposite or alternate, entire; flowers small, perfect, polygamous, or dioecious, subtended by a bract and 2 bractlets; perianth usually 5-parted; stamens as many as the perianth segments or fewer, often alternating with staminodia (sterile stamens); ovary superior, 1-celled; fruit a capsule or utricle, dehiscent or indehiscent.—All the Central American genera are represented in Costa Rica.

ACHYRANTHES L.

Annual or perennial herbs; leaves opposite, petiolate; flowers green, in simple or branched spikes; bracts spinescent.—The sharp bracts penetrate the flesh easily.

Achyranthes aspera L. *Mozotillo, Rabo de chancho.* Common in the Meseta Central, ranging to the coasts, a weed of waste or cultivated ground, often growing in thickets. Tropics of both hemispheres. Leaves acuminate.

Achyranthes indica (L.) Mill. Atlantic coast, in cultivated or waste ground. Probably introduced from the Old World, but now well established in tropical America. Leaves rounded at the apex.

ALTERNANTHERA Forsk.

Herbs with opposite leaves; flowers perfect, in spikes or heads, usually somewhat compressed; sepals 5; filaments united to form a tube; fruit a utricle.—From Central America about 15 species are known.

Alternanthera Bettzickiana (Regel) Standl. An ornamental garden plant. Probably of American origin but unknown in a wild state. Plants low, with narrow leaves, these tinged with various colors—red, white, or yellow.

Alternanthera costaricensis Kuntze, Rev. Gen. 538. 1891. *Achyranthes costaricensis* Standl. Journ. Wash. Acad. Sci. 5: 74. 1915. Type collected on the Atlantic coast by Kuntze. Also at Siquirres. Endemic.

Alternanthera ficoidea (L.) R. Br. Waste ground of the Atlantic coast. Of wide distribution in tropical America.

Alternanthera laguroides Standl. in Standl. & Cald. Lista Pl. El Salv. 74. 1925. *Achyranthes laguroides* Standl. Contr. U. S. Nat. Herb. 18: 90. 1916. San Francisco de Guadalupe, *Tonduz 8006.* Meseta Central, descending to the coasts. Panama to Salvador. An erect or clambering plant, the flowers white, in pedunculate spikes 1–2 cm. long.

Alternanthera Lehmannii Hieron. Forests of the Atlantic slope, 600–1,000 meters; region of San Ramón. Also in Colombia.

Alternanthera megaphylla Standl. Field Mus. Bot. 8: 9. 1930. *Achyranthes megaphylla* Standl. N. Amer. Fl. 21: 141. 1917. Río Hondo, Llanuras de Santa Clara, 100 meters, *Cook & Doyle 573.* Common in forests of the Atlantic slope; region of San Ramón; also in Guanacaste. Endemic.

Alternanthera microcephala (Moq.) Schinz. Common in forests of the central region, 1,400–1,800 meters. Panama to Mexico. A slender herb with white flowers.

Alternanthera polygonoides (L.) R. Br. *Golondrina.* Waste ground, Meseta Central to the Pacific coast. A species of wide distribution. Plants prostrate, the flowers white.

Alternanthera repens (L.) Kuntze. Common in streets and roads of the central region. Pantropic in distribution. Stems prostrate, the flower white, in sessile heads. In Central America this species grows almost always between cobblestones.

Alternanthera sessilis (L.) R. Br. Meseta Central to the Atlantic coast, in waste ground. Of pantropic distribution.

Alternanthera versicolor (Lam.) Regel. An ornamental garden plant, noteworthy for its variegated leaves, tinged with various colors. Probably of American origin, but unknown in a wild state.

Alternanthera Williamsii Standl. *Achyranthes Williamsii* Standl. Dry thickets of the Pacific coast. Panama to southern Mexico.

AMARANTHUS L. Amaranth, Pigweed

Annuals, the leaves alternate, petiolate; flowers usually green, dioecious, monecious, or polygamous, in spikes or panicles; fruit utricular, dehiscent or indehiscent.—About 6 species are known from Central America.

Amaranthus ascendens Loisel. Sandy stream beds near San José. A species almost pantropic in distribution, but not native here. Very rare in Central America.

Amaranthus dubius Mart. Waste places in the Atlantic coast. Widely distributed in tropical America, a common weed in most of the Central American tierra caliente.

Amaranthus hybridus L. *Bledo, Mercolina(?).* Common in cultivated or waste ground of the Meseta Central. Generally distributed in tropical and temperate America. The leaves and young shoots often are used as pot herbs or quelites.

Amaranthus scariosus Benth. Pacific coast, in cultivated or waste ground. Ranging to southern Mexico. An erect plant 1–2 meters high.

Amaranthus spinosus L. *Bledo.* Abundant in cultivated and waste ground, Meseta Central to the coasts. Pantropic in distribution. Easy of recognition because of the stiff, sharp spines in the leaf axils.

CELOSIA L.

Celosia argentea L. Rare in waste ground of the Meseta Central and Atlantic coast. Widely distributed in tropical America, but probably nowhere truly wild. Plants found in such places are merely the most reduced and most nearly primitive form of the garden cockscomb, *Celosia cristata* L., a showy ornamental plant common in Central American gardens, and known by the names Cresta de gallo, Abanico, and Terciopelo. The cultivated plants have an exaggerated and fasciated inflorescence, somewhat fan-like in form and usually purple-red.

CHAMISSOA HBK.

More or less scandent herbs or shrubs; leaves alternate; flowers perfect or monoecious, in axillary or terminal, simple or paniculate spikes; fruit a utricle, the single seed surrounded by a fleshy aril.—Two or three species are known from Central America.

Chamissoa altissima (Jacq.) HBK. Abundant almost everywhere in the tierra caliente, usually in thickets. Widely distributed in tropical America. More or less scandent, the stems 2–3 meters long; leaves ovate or lanceolate; style shorter than the stigmas.

Chamissoa Maximiliani Mart. Atlantic coast, but rare. Ranging to Brazil. Style longer than the stigmas.

CYATHULA Lour.

Annual or perennial herbs; leaves opposite, petiolate; flowers fasciculate and spicate, the segments of the sterile flowers terminated by hooked bristles; fruit a utricle.—Only two species occur in Central America. The flowers adhere tenaciously to clothing by their hooked bristles, which penetrate the flesh easily.

Cyathula achyranthoides (HBK.) Moq. Waste ground of the tierra caliente, often abundant; region of San Ramón. A species of wide distribution in tropical America. Leaves oval to oblong-elliptic, acuminate, strigose or almost glabrous; sepals 3–4 mm. long.

Cyathula prostrata (L.) Blume. Common in waste ground of the coasts. A species of wide distribution, probably introduced in America from the Old World. Sepals 2 mm. long, the spikes 2–7 cm. long.

GOMPHRENA L. Globe amaranth

Annual or perennial herbs, the leaves opposite; flowers perfect, in dense spikes or heads; fruit a compressed utricle.—Six species are known from Central America.

Gomphrena dispersa Standl. Common in waste ground, Meseta Central to the coasts. Mexico to Panama and the Antilles. Annual or perennial, the stems prostrate or procumbent, elongate; leaves oblong or oval, obtuse, sericeous on the lower surface; flowers white or pink, the heads 12–15 mm. thick. This species probably is not distinct from *G. decumbens* Jacq., but it is at least a recognizable variety of it.

Gomphrena globosa L. *Siempreviva, Inmortal.* Common in gardens. Of American origin but unknown in a wild state, probably cultivated by the native people from the most remote times. The flower heads preserve their form and color when dried, and they are used in many parts of the earth for funeral wreaths. They are white, red, purple, or yellow, and 2–3 cm. thick.

IRESINE P. Br.

Herbs or shrubs, sometimes scandent; leaves opposite, petiolate; flowers perfect, polygamous, or dioecious, in spikes or heads; stamens united into a tube; fruit utricular.—About a dozen species occur in Central America.

Iresine angustifolia Euphr. Thickets of the Pacific Coast; region of San Ramón; Río Cañas, Guanacaste. Widely distributed in tropical America. Plants low or elongate, erect or reclining, glabrous or nearly so; leaves short-petiolate, the blades lanceolate or linear-lanceolate.

Iresine Calea (Ibáñez) Standl. Common in the Meseta Central, and in many parts of the Pacific slope, in hedges and thickets. Ranging to Mexico. A shrub of 2–5 meters, erect or scandent; leaves ovate or oblong; flowers in small, white spikes.

Iresine Celosia L. *Camarón.* Abundant almost everywhere from the coasts to the Meseta Central, and often in localities of greater elevation, growing in forest, thickets, or waste ground. Generally distributed in tropical America. Plants erect or scandent; flowers dioecious, white, in small spikes. One of the most common plants almost throughout Central America, abundant in banana plantations.

Iresine costaricensis Standl. Contr. U. S. Nat. Herb. 18: 94. 1916. Las Vueltas, Tucurrique, 635 meters, *Tonduz 13183*. Endemic. A scandent shrub, the stems 10–15 meters long; leaves oblong-elliptic, acuminate.

Iresine frutescens Moq. Common in mountains of Dota, 1,500–1,800 meters; region of San Ramón; a forest species. Ranging

to Mexico. More or less scandent, almost glabrous; flowers dioecious, white, scarcely 1 mm. long, smaller than in *I. Celosia.*

Iresine spiculigera Seub. *I. acicularis* Standl. Forests of the coasts, ascending the slopes of the volcanoes. Guatemala to South America. Plants erect or scandent; flowers white; inflorescence with lustrous, golden hairs.

PFAFFIA Mart.

A single species is known from Central America.

Pfaffia Hookeriana (Hemsl.) Greenm. *Hebanthe Hookeriana* Hemsl. Central region and Pacific slope, in forests or thickets. Panama to Mexico. A scandent shrub; leaves opposite, oblong to ovate, acute or acuminate, strigose or glabrous; flowers perfect, in paniculate spikes 2–5 cm. long; fruit utricular.

PHILOXERUS R. Br.

A single species grows in Central America.

Philoxerus vermicularis (L.) R. Br. Beaches of the Atlantic coast, and probably also of the Pacific. Of wide distribution; a characteristic plant of sea beaches. A glabrous, perennial herb, somewhat fleshy; leaves opposite, sessile, linear or oblong; flowers white, perfect, in dense spikes 3–5 cm. long; fruit utricular.

PLEUROPETALUM Hook. f.

Glabrous shrubs; leaves alternate, petiolate; flowers perfect, greenish, racemose or paniculate; sepals 5, many-nerved; fruit a fleshy capsule with few or numerous seeds.—Another species of the genus is known from the Galapagos Islands.

Pleuropetalum calospermum Standl. Forests of the mountains of Guanacaste, 600 meters. Also in Salvador. A shrub 1–2 meters high; leaves ovate or oblong; sepals 3–4 mm. long; seeds numerous, almost 2 mm. broad.

Pleuropetalum pleiogynum (Kuntze) Standl. Journ. Wash. Acad. Sci. 13: 369. 1923. *Celosia pleiogyna* Kuntze, Rev. Gen. 541. 1891. Type collected in Costa Rica by Kuntze, probably in the Atlantic coast. Also in Panama. Sepals 5 mm. long.

Pleuropetalum Sprucei (Hook. f.) Standl. *P. costaricense* Wendl. ex Hook. f. Bot. Mag. *pl. 6674.* 1883; *P. tucurriquense* Donn. Smith, Bot. Gaz. 61: 387. 1916 (Las Vueltas, Tucurrique,

700 meters, *Tonduz 13017*). Wet forest, Atlantic coast and mountains of Guanacaste; region of San Ramón; Santa María de Dota. Mexico to Ecuador. A shrub of 1–3 meters; sepals 2.5 mm. long; seeds few, small.

NYCTAGINACEAE. Four-o'clock Family

Reference: Standley, Allioniaceae, N. Amer. Flora 21: 171–254. 1918.

Herbs, shrubs, or trees, often scandent or armed with spines; leaves alternate or opposite, entire; flowers perfect or unisexual, regular or nearly so, bracteate or involucrate, the involucre often calyx-like; perianth simple, inferior, often colored to resemble a corolla; stamens 1–many; ovary 1-celled, 1-ovulate; fruit an anthocarp, composed of an indehiscent utricle and the persistent and adherent base of the perianth tube.—Five other genera are represented in Central America.

BOERHAAVIA L.

Perennial or annual herbs; leaves petiolate; flowers perfect, small, bracteate; stamens 1–5; fruit obovoid or obpyramidal.—Only the following species are known from Central America.

Boerhaavia caribaea Jacq. Common in waste ground of the tierra caliente. A species of wide distribution. Branches of the inflorescence puberulent; flowers glomerate, dark red; fruit viscid, obovoid. The sticky fruits adhere to clothing and to the feathers of birds.

Boerhaavia coccinea Mill. Common in the tierra caliente. A species of wide distribution. Branches of the inflorescence glabrous; flowers dark red; fruit viscid, obovoid.

Boerhaavia erecta L. Common in waste ground of the tierra caliente. A species of general distribution in tropical America. An erect annual; flowers white or pink, in cymes; fruits narrowly obpyramidal, glabrous. A common plant almost everywhere in Central America except in the higher regions.

BOUGAINVILLEA Commers.

All species of the genus are natives of South America.

Bougainvillea glabra Choisy. A well known ornamental vine, cultivated in most Costa Rican gardens, and in tropical regions of all parts of the earth. Native of Brazil.

MIRABILIS L.

Perennial herbs; inflorescence axillary or terminal, cymose; flowers perfect, surrounded by a calyx-like involucre; perianth corolla-like; stamens 3–5.—Another Central American species grows in Guatemala.

Mirabilis Jalapa L. *Maravilla.* A common ornamental plant of gardens; also naturalized in some localities. The four-o'clock, one of the common cultivated garden flowers of the United States, is a native of America, perhaps of Peru, but it is unknown in a truly wild state. Well known for its handsome and fragrant flowers, white, red, yellow, or striped, which open in the evening and close the next morning. It is not uncommon to find upon one plant flowers of two colors, a fact that gave rise to the common Spanish name.

Mirabilis violacea (L.) Heimerl. Common in waste ground of the Atlantic coast; Guanacaste. A species of wide distribution. A prostrate herb, the leaves ovate-triangular, acute; flowers purple-red, much smaller than those of *M. Jalapa.*

NEEA Ruiz & Pavón

Shrubs or trees, unarmed; flowers dioecious, small, cymose; stamens 5–10, included; fruit fleshy.

Neea amplifolia Donn. Smith, Bot. Gaz. 61: 386. 1916. Río Hondo, near Madre de Dios, Prov. Limón, 200 meters, *Pittier 10356.* Forests of the Atlantic plains. Also in Panama. A shrub or tree of 2–6 meters; leaves large, oblong-elliptic, pilose on the lower surface; perianth 10–12 mm. long.

Neea orosiana Standl. Journ. Wash. Acad. Sci. 15: 473. 1925. Wet forest near Orosi, Prov. Cartago, *Standley 39738.* Endemic. A shrub of 1.5–2.5 meters; leaves oblong-oblanceolate, 5.5–7.5 cm. long, long-acuminate, glabrous; fruits red, 12 mm. long.

Neea Pittieri Standl. Contr. U. S. Nat. Herb. 13: 383. 1911. Valle de Tuis, 1,000 meters, *Pittier 16097.* Common in forests of the Atlantic slope, ascending to 1,300 meters. Also in Panama. A shrub of 1–2.5 meters; leaves ovate or oblong, usually 8–12 cm. wide, acuminate, glabrous; fruit red, 8–10 mm. long.

Neea psychotrioides Donn. Smith. Common in forests of the tierra caliente, ascending to 1,500 meters; region of San Ramón. Panama to Mexico. A shrub or small tree, sometimes 10 meters high; leaves mostly 3–6 cm. wide, glabrous; flowers green or yellowish; fruit red, 7–9 mm. long.

Neea urophylla Standl. Apparently frequent in forests in the region of San Ramón, 1,000–1,200 meters. Panama. A shrub 1–2 meters high; leaves short-petiolate, opposite or ternate, elliptic, larger than in most other species, mostly 8–18 cm. wide, abruptly acuminate, nearly glabrous; flowers yellowish or whitish.

PISONIA L.

Shrubs or trees, the branches sometimes elongate and more or less scandent or clambering, armed with spines; flowers small, green or reddish, cymose, dioecious; stamens 6–9, exserted; fruit dry, 5-angulate, the angles provided with rows of stipitate glands.—Four species are known from Central America.

Pisonia aculeata L. *Uña de tigre.* Common in the Atlantic coast, especially in coastal thickets. A plant of wide distribution in America and Asia. A densely branched shrub or tree; leaves elliptic or oval, petiolate, pubescent or glabrous; fruits 9–12 mm. long, 3–4 mm. thick.

Pisonia macranthocarpa Donn. Smith. Nicoya, and probably throughout the Pacific coast. Mexico to Venezuela and Cuba. Fruit 7–10 mm. thick.

Pisonia silvatica Standl., sp. nov.—Frutex 2–3.5 m. altus praeter inflorescentias omnino glaber, ramis gracilibus plus minusve tortuosis ochraceis ad nodos spinis rectis validis usque 12 mm. longis armatis; folia mediocria petiolata chartacea, petiolo gracili 5–10 mm. longo; lamina lanceolato-oblonga, elliptico-lanceolata vel oblongo-ovata 6.5–10 cm. longa 2.5–4 cm. lata sensim acuminata, basi acuta vel attenuata, in sicco lutescenti-viridis, subtus paullo pallidior, costa gracili utrinque prominente, nervis lateralibus obscuris vel subobsoletis; inflorescentia femina primo capituliformis, serius paullo laxior, dense multiflora ad 1.5 cm. lata, pedunculo gracili 1.5–3.5 cm. longo glabro, bracteis minutis, pedicellis brevissimis vel nullis minutissime puberulis; perianthium viridescens vel viridescenti-album 2–2.5 mm. longum minute puberulo-tomentellum sursum paullo dilatatum, lobis brevissimis obtusis; stylus longe exsertus interdum perianthio duplo longior.—In forest, hills of San Pedro de San Ramón, 1,075 meters, *Brenes 4822* (type in Herb. Field Mus.); also *Nos. 4548* and *4694* from the same locality. Related to *P. fasciculata* Standl., of Nicaragua and Guatemala, material of which I have not seen recently. That species is known only from staminate specimens but, from description, must be clearly distinct.

TORRUBIA Vell.

Two other species grow in Central America.

Torrubia costaricana Standl. Contr. U. S. Nat. Herb. 13: 385. 1911. Nicoya, *Tonduz 13927*. Forests of both coasts. Also in Panama. A small tree, as much as 8 meters high; leaves elliptic-oblong, 7–11 cm. long, acuminate, glabrous; flowers small, green, cymose, dioecious; stamens exserted; fruit fleshy. The genus is sometimes treated as a subgenus of *Pisonia*.

BATIDACEAE

The family consists of a single genus and species.

BATIS L.

Batis maritima L. In tidal flats along the coasts. A plant of wide distribution in tropical regions. Plants somewhat shrubby, 1 meter high or less; leaves opposite, linear, flat on the upper surface, convex on the lower, 1–3 cm. long; flowers minute, dioecious, in short aments; fruit a small, fleshy syncarp. A characteristic plant of Central American coasts.

PHYTOLACCACEAE. Pokeweed Family

Reference: Percy Wilson, N. Amer. Flora 21: 257–266. 1932.

Herbs or shrubs, usually glabrous; leaves alternate, entire, petiolate, without stipules, or the stipules minute; flowers small, perfect or unisexual, racemose; sepals 4 or 5, persistent beneath the fruit; petals usually none; stamens 4 or numerous; ovary superior, of 1–many carpels; fruit fleshy or coriaceous.—Four other genera are represented in Central America.

MICROTEA Swartz

In Central America there is a single species of this genus.

Microtea debilis Swartz. Cultivated and waste ground of the tierra caliente. Widely distributed in tropical America. A small, prostrate herb; leaves spatulate to obovate; flowers minute, green; fruit minute, tuberculate, green.

PETIVERIA L.

Petiveria alliacea L. *Ajillo*. Waste ground, Meseta Central to the coasts. A species of wide distribution. An herb a meter high or less; leaves elliptic or ovate; flowers perfect, almost sessile, appressed to the rachis of the raceme, green or pink; fruit dry,

with 4 inflexed setae at the apex. All parts of the plant exhale a strong odor of garlic. It is said that a garlic odor is imparted to the milk of cows that eat the plant. The spine-like setae of the fruit penetrate the flesh easily and painfully, and are removable with difficulty.

PHYTOLACCA L. Pokeweed

Tall, stout herbs, the large leaves elliptic or lanceolate; flowers perfect or dioecious, in racemes or spikes, white or pink, small; fruit a 5–16-celled berry.—Four species are known from Central America.

Phytolacca icosandra L. *Jaboncillo, Tinta, Calalú* (Atlantic coast). *P. octanda* L.; *P. purpurascens* A. Br. & Bouché. Common in waste ground of the Meseta Central, extending to the Atlantic coast; ascending to 1,850 meters or more; Cocos Island. Widely distributed in tropical America. A perennial herb about a meter high; pedicels very short; flowers green or pink; fruits purple-black, juicy. The young leaves and shoots of this and other species are used like spinach by the Jamaicans of the Atlantic coast. The purple juice of the berries is sometimes employed in Costa Rica as ink. The roots of some and perhaps all species of *Phytolacca* are poisonous.

Phytolacca rivinoides Kunth & Bouché. *Jaboncillo, Calalú, Colorín, Quelite.* Common in forests and waste ground of the Atlantic coast and central region, ascending the mountains to 3,000 meters; Guanacaste; Cocos Island. Widely dispersed in tropical America. An herb 1–2 meters high, the stems reddish or purplish; much like the preceding species, but the pedicels slender and elongate.

Phytolacca rugosa Braun & Bouché. Common in the central region, 1,000–2,000 meters. Mexico to South America. A tall herb; pedicels short.

RIVINA L.

The genus consists of a single species.

Rivina humilis L. *Carmín.* Common in the Meseta Central, extending to the coasts, growing mostly in waste places. Species almost pantropic. A branched herb a meter high or less; leaves ovate to almost triangular, acute; flowers small, green or pink; fruit a bright red berry 4 mm. long. The racemes of brilliantly colored berries are handsome and showy.

TRICHOSTIGMA A. Rich.

Erect or scandent shrubs; ovary 1-celled; fruit a globose, 1-seeded berry.—From Central America only two species are known.

Trichostigma octandrum (L.) H. Walt. Thickets of the tierra caliente. A species of wide distribution in tropical America. A more or less scandent shrub; leaves oblong to elliptic; flowers greenish white; stamens 8–12; sepals in fruit 4 mm. long or less.

Trichostigma polyandrum (Loes.) H. Walt. Common in thickets and forests of the tierra caliente, ascending to 900 meters. Also in Nicaragua. A more or less scandent shrub 1–2 meters high; stamens 20–25; sepals 6–7 mm. long; fruit purple.

AIZOACEAE. Carpet-weed Family

Reference: Percy Wilson, N. Amer. Flora 21: 267–277. 1932.

Annual or perennial herbs; leaves opposite, alternate, or verticillate, entire, the stipules scarious or none; flowers small, perfect, regular, with 4 or 5 persistent sepals; petals small or none; fruit usually capsular.

GLINUS L.

The genus is represented in Central America by a single species.

Glinus radiatus (Ruiz & Pavón) Rohrb. Near Los Lirios, Pacific coast, *Brenes 3872*. Mexico and West Indies to South America. A stellate-tomentose, prostrate, much branched annual; leaves petiolate, elliptic to orbicular-spatulate, 5–20 mm. long, rounded or subacute at the apex; flowers fasciculate in the leaf axils, subsessile; sepals 4 mm. long; petals none.

MOLLUGO L. Carpet-weed

A single species of this genus is known from Central America.

Mollugo verticillata L. Waste places of the Pacific coast. Widely distributed in tropical and temperate regions of the earth. Plants annual, prostrate, glabrous, forming small, round mats; leaves verticillate, linear-spatulate; flowers minute, axillary; capsule 3-celled.

SESUVIUM L.

A single species of the genus occurs in Central America.

Sesuvium Portulacastrum L. Frequent on tidal flats of the coasts. Widely distributed in tropics of almost the whole earth. Plants very succulent, prostrate, glabrous; leaves sessile, linear or

oblanceolate, 1.5–4 cm. long; petals none; stamens numerous; capsule 3–5-celled. A characteristic species of tropical seacoasts.

TRIANTHEMA L.

In Central America the genus is represented by only one species.

Trianthema Portulacastrum L. Pastures near Bebedero, Guanacaste, *Brenes 12559*. Widely distributed in warmer regions of both hemispheres. A succulent annual, glabrous or nearly so, much branched, the stems prostrate or ascending; leaves opposite, long-petiolate, orbicular or broadly obovate, 1.5–4.5 cm. long; flowers axillary, sessile; sepals 2–5 mm. long; petals none.

PORTULACACEAE. Purslane Family

Reference: P. A. Rydberg, N. Amer. Flora 21: 279–336. 1932.

Annual or perennial herbs, fleshy, the leaves alternate or opposite, entire; flowers perfect, regular; sepals 2, the petals 4 or 5; ovary 1-celled, superior or inferior, the ovules numerous; fruit capsular.—The genus *Calandrinia* is represented in Guatemala.

PORTULACA L. Purslane

Leaves alternate, the stipules scarious or setiform; stamens 8 or numerous; ovary inferior or semi-inferior.—Only two species are known from Central America.

Portulaca oleracea L. *Verdolaga*. Cultivated or waste ground, common in many places. Pantropic in distribution, and growing also in temperate regions. A prostrate or ascending annual, the leaves very thick, obovate; flowers sessile, yellow, open in the morning, closing about noon. The plant is employed generally in Central America as a pot herb or *quelite*, being similar in flavor and quality to spinach. Because of its fleshy stems and leaves it has great vitality, and will grow for a long time if pulled from the soil and left in an exposed place.

Portulaca pilosa L. Río Changuinola, Los Loros on the Pacific coast, and probably elsewhere. A species of wide distribution. A small annual, the short leaves terete, their axils densely hairy; petals red.

TALINUM Adans.

Talinum paniculatum (Jacq.) Gaertn. Waste ground, Meseta Central to the coasts. A species of wide distribution in tropical America. A perennial or annual herb as much as a meter high,

glabrous, the leaves obovate, 5–10 cm. long; flowers reddish or purple, in narrow panicles; ovary superior. In cultivation in gardens there is sometimes seen a form with green and white leaves, known in Costa Rica as Flor de nieve.

There will probably be found in Costa Rica also *T. triangulare* (Jacq.) Willd., a species known from other parts of Central America.

BASELLACEAE

Reference: Percy Wilson, N. Amer. Flora 21: 337–339. 1932.

The genus *Anredera* also is represented in Central America.

BOUSSINGAULTIA HBK.

Herbaceous vines; leaves succulent, alternate, entire; flowers small, perfect, racemose or paniculate; sepals 2; petals 5; stamens 5; fruit utricular, 1-seeded.

Boussingaultia leptostachya Moq. Reported for Costa Rica, without mention of the locality. A species of wide distribution in tropical America. Leaves ovate, acute at the base; flowers white, 2 mm. long; styles united only near the base.

Boussingaultia ramosa (Moq.) Hemsl. *Hiedra.* Thickets and hedges of the central region. Extending to Mexico. Plant very fleshy, the leaves truncate or cordate at the base; flowers white; styles united for their whole length.

CARYOPHYLLACEAE. Carnation Family

Annual or perennial herbs; leaves opposite, entire; flowers regular, perfect, with 4 or 5 sepals and the same number of petals; stamens 8 or 10 or fewer; ovary free, superior, usually 1-celled; styles 2–5; fruit capsular.—The genus *Polycarpaea* is represented in Panama.

ARENARIA L.

Slender, prostrate herbs, the narrow leaves sessile; flowers terminal, usually cymose, sometimes solitary in the leaf axils; petals 5, entire or subemarginate; stamens 10.—Another species has been found on the volcanoes of Guatemala.

Arenaria lanuginosa (Michx.) Rohrb. Forests and waste places of the central region, 1,000–3,000 meters. Widely distributed in America. Stems slender, pubescent, the leaves linear or oblong-lanceolate; flowers axillary, pedicellate; sepals 2–3 mm. long; petals equaling or shorter than the sepals.

Arenaria megalantha (Rohrb.) F. N. Williams. *A. lanuginosa* var. *ensifolia* Rohrb. Paramos and forests of the mountains of the central region, 1,000–3,000 meters. Mexico to South America. Sepals 4–5 mm. long, shorter than the petals.

CERASTIUM L.

One species of the genus is native in Guatemala.

Cerastium viscosum L. *C. glomeratum* Thuill. Abundant in meadows of the central mountains, 1,500–2,800 meters. A European species, naturalized in many parts of America. A prostrate, viscid-pubescent annual; leaves oblong or obovate, 8–25 mm. long; flowers white, in terminal cymes; stamens 10; capsule cylindric, much longer than the calyx.

DIANTHUS L.

Dianthus barbatus L. An ornamental plant of gardens. Imported from Europe. The usual English name for this plant is Sweet William.

Dianthus Caryophyllus L. *Clavel.* The carnation is cultivated commonly in Costa Rican gardens. A species of the Mediterranean region.

DRYMARIA Willd.

Small and very slender, perennial or sometimes annual plants; leaves with small stipules; flowers small, pedicellate, cymose; stamens 5 or fewer; capsule 3-valvate.—Other Central American species are known from Guatemala.

Drymaria cordata (L.) Willd. *Nervillo.* Meseta Central to the Atlantic coast, in waste or cultivated ground. A species of wide distribution. Plants erect or prostrate, 10–30 cm. long; leaves rounded or ovate-rounded, 5–25 mm. long, glabrous; flowers 3–4 mm. long.

Drymaria villosa Schlecht. & Cham. Meseta Central to the Atlantic coast; region of San Ramón; ascending to 1,400 meters. Panama to Mexico. Leaves pilose.

SCLERANTHUS L.

Scleranthus annuus L. Sandy stream beds near Cartago. A European plant, naturalized in some parts of North America. An annual with linear leaves; stipules none; flowers greenish; fruit utricular, with a single seed. Known in Central America only from Costa Rica.

SILENE L.

No species of the genus are native in Central America.

Silene gallica L. Meadows of the volcanoes, 2,000 meters. A European species, naturalized in many parts of America; known in Central America only from this region. An erect annual 10–30 cm. high, pilose; leaves oblong-spatulate; sepals united; flowers almost sessile, white or pink; stamens 10.

STELLARIA L.

Slender, annual or perennial herbs; petals 4 or 5, usually bifid; styles 3.—All the known Central American species are found in Costa Rica.

Stellaria irazuensis Donn. Smith, Bot. Gaz. 23: 236. 1897. El Roble, Volcán de Irazú, 3,000 meters, *Tonduz 4292*. Forests of Irazú and Cantón de Dota, 2,000–3,000 meters. Endemic. Leaves ovate or deltoid, petiolate, glabrous; sepals only 1.5 mm. long.

Stellaria media (L.) Cirillo. Region of Cartago. A European species, naturalized in many parts of North America. Unknown elsewhere in Central America.

Stellaria nemorum L. Meseta Central and region of Dota, ascending the mountains to 3,000 meters, growing in forest and meadows. Widely distributed in America and extending to Europe. Leaves ovate, usually glabrous, acuminate; sepals 4–6 mm. long.

Stellaria nubigena Standl. Journ. Wash. Acad. Sci. 17: 250. 1927. South slope of Volcán de Turrialba, near the Finca del Volcán de Turrialba, 2,300 meters, *Standley 35344*. Curridabat; Las Nubes, Prov. San José; moist places, at 1,200–2,300 meters. Leaves oblong; sepals 2 mm. long. Endemic.

Stellaria ovata Willd. Meseta Central to the coasts, also ascending the slopes of the mountains to 2,500 meters, growing in forest or waste ground, abundant in many places. Mexico to South America. Leaves ovate or rounded, obtuse and mucronate; sepals 3–5 mm. long.

NYMPHAEACEAE. Waterlily Family

Aquatic, perennial herbs, often with large, thick rhizomes; leaves long-petiolate; flowers perfect, small or large, the peduncles simple; sepals 3–5; petals 3 to many; ovary of 3 or more free or united carpels, these in fruit distinct or united to form a fleshy, indehiscent fruit.

CABOMBA Aubl.

A single species is known from Central America.

Cabomba aquatica Aubl. Golfo Dulce. Mexico to South America. Leaves verticillate, the lower ones palmately parted, the segments almost capillary, the upper leaves elliptic, peltate; petals 3, purple; stamens 6; fruit small, of 3 carpels.

NYMPHAEA L. Waterlily

Large plants with thick rhizomes; leaves and flowers floating on the surface of the water; sepals 4; petals numerous; fruit globose, fleshy.—Three species are known from Central America.

Nymphaea ampla (Salisb.) DC. Atlantic and Pacific lowlands. A species of wide distribution. Leaves 15–30 cm. long or larger, thick, dentate, purple beneath; flowers white, 7–13 cm. broad; stamens 30–190, yellow. A plant with showy, beautiful flowers. In some parts of Central America it is known by the name Ninfa.

Nymphaea blanda Mey. Common in the Pacific coast. Guatemala to the Guianas. Leaves much smaller than in the preceding species, thin, green beneath; flowers white, 8–10 cm. broad. It is probably this species that is reported from Costa Rica by Donnell Smith as *N. gracilis* Zucc., and discussed by Wercklé as follows: "On the wide plains of Guanacaste the most insignificant depressions are filled with a little water toward the end of the rainy season, and this is covered with myriads of little leaves of a pygmy *Nymphaea* whose small, white flowers fill the air with their fragrance. In the dry season these depressions are dry as a desert, but the small, globose, very hard tubers resist the destructive effects of the burning sand, to become resuscitated after some five months. The small leaves of this plant are perfectly smooth on both sides, and it is impossible to understand why the native people call the plant 'flor de mondongo,' unless they have seen one of the Nymphaeaceae with elevated veins on the lower leaf surface, like those of *Victoria regia*." It is quite possible that this plant described by Wercklé is a species at present unknown, since I have seen no specimens of it.

CERATOPHYLLACEAE. Hornwort Family

CERATOPHYLLUM L.

The genus consists of a single species.

Ceratophyllum demersum L. Rivers of Guanacaste, and probably elsewhere. A species of wide distribution, almost through-

out the earth. A submerged aquatic, the slender stems branched; leaves verticillate, their divisions filiform, dichotomous or trichotomous; flowers minute, green, monoecious or dioecious, solitary and sessile in the leaf axils; perianth none; stamens 10–20; fruit a small achene.

RANUNCULACEAE. Buttercup Family

Herbs or scandent shrubs; leaves simple or compound, without stipules; flowers perfect or unisexual; sepals 3–5, usually deciduous; petals commonly 5, sometimes none; stamens numerous; fruit of few or numerous achenes or follicles.—All the Central American genera are represented in Costa Rica.

CLEMATIS L.

Scandent shrubs; leaves opposite, petiolate, pinnate; flowers white, in paniculate cymes; sepals 4, petal-like; petals none; fruit a head of achenes, these with long, soft, barbate-plumose tails.—Only the species listed here are known from Central America.

Clematis dioica L. *Barba de viejo, Cabellos de ángel.* In thickets and hedges, Meseta Central to the Pacific coast. Generally distributed in tropical America. A small or large vine; leaflets entire or with a few narrow, acute teeth, glabrous or somewhat sericeous beneath, usually rounded at the base. The Costa Rican specimens are variable and perhaps represent two or more distinct forms, but the species is so variable and widely distributed that it is difficult to determine how or whether it should be divided. The stems contain a tough fiber and are sometimes employed as a substitute for twine. The leaves are caustic and vesicant.

Clematis grossa Benth. *Barba de viejo.* Common in thickets and forests of the central region, 1,200–1,900 meters; San Ramón, at 1,100 meters. Ranging to Mexico. Leaflets with few or numerous broad, obtuse teeth, densely pilose on the lower surface, often cordate at the base.

DELPHINIUM L. Larkspur

Delphinium Ajacis L. *Espuela, Espuela de caballero.* An ornamental garden plant with blue or pink flowers. Native of Europe.

NIGELLA L.

Nigella damascena L. An ornamental garden plant with finely dissected leaves. Imported from Europe.

RANUNCULUS L. Buttercup

Perennial herbs, the leaves alternate, simple or divided; flowers yellow, perfect, with 5 petals; fruit a small head of few or numerous achenes.—Two or three additional species occur in Guatemala.

Ranunculus flagelliformis Smith. Moist meadows of the central volcanoes, 1,200–2,400 meters. Ranging to Argentina. A prostrate, glabrous herb; leaves reniform or broadly ovate, deeply cordate at the base, entire or undulate. Reported from Costa Rica as *R. stolonifer* Hemsl., a Mexican species.

Ranunculus peruvianus Pers. Paramos of Cerro de Las Vueltas and Cerro de La Muerte, 3,000 meters. Ranging to Peru. Unknown elsewhere in Central America. An erect herb, forming dense clumps, almost glabrous; basal leaves reniform or broadly cordate, dentate, the cauline leaves deeply lobate.

Ranunculus repens L. Common in meadows of the central volcanoes, 1,500–2,900 meters. A European species, naturalized in many parts of North America; imported into Costa Rica probably with grass seeds. Plants prostrate, pilose; leaves with 3 lobate and dentate segments. This plant has been reported from Costa Rica as *R. pilosus* DC., a Colombian species. If the Costa Rican plant really is different from the European one, as possibly may be the case, I am unable to find any means of distinguishing it. It seems to me much more probable that it is merely the European plant that has become well established in so many parts of the United States.

THALICTRUM L.

Thalictrum Lankesteri Standl., sp. nov.—Foliola numerosissima breviter peltata vel basi profunde anguste cordata brevissime triloba, lobis latis apice late rotundatis vel subtruncatis integris vel ex parte crenato-lobatis, supra glabra vel scaberula, subtus paullo pallidiora glabra vel minute glanduloso-papillosa; achaenia pauca glabra fusiformia valde obliqua 6 mm. longa sessilia apice sensim longeque attenuata valde costata.—Las Cóncavas, Prov. Cartago, July, 1919, *C. H. Lankester 337* (Herb. Field Mus.). An erect herb a meter high or taller; leaves alternate, with very numerous and broad leaflets, these shallowly trilobate and somewhat peltate. An endemic species, related to *T. guatemalense* C. DC. & Rose. Collected also on the slopes of Turrialba, 2,000–3,400 meters.

BERBERIDACEAE. Barberry Family

Shrubs, the leaves alternate, simple or pinnate; flowers perfect, racemose; sepals and petals distinct, imbricate; stamens as many as the petals; ovary with 2 or more ovules; fruit a berry.—Only two genera are represented in Central America.

BERBERIS L. Barberry

A single species is known from Central America.

Berberis nigricans Kuntze, Rev. Gen. 10. 1891. Volcán de Irazú, *Kuntze*. Endemic. Known from Irazú and the paramos of the region of Dota, 2,600–3,000 meters. A densely branched shrub 1.5–4 meters high, the branches armed with stout spines 1–2 cm. long; leaves coriaceous, short-petiolate, obovate, 2–7 cm. long, obtuse or rounded at the apex, dentate, the teeth spine-tipped; racemes short, the flowers orange; berries purplish blue.

MAHONIA Nutt.

Another species occurs in Guatemala.

Mahonia paniculata Oerst. Nat. For. Kjoebenhavn Vid. Medd. 1856: 36. 1857. *Palo de San Juan. Berberis paniculata* Hemsl. Biol. Centr. Amer. Bot. 1: 24. 1879. *B. Hemsleyi* Donn. Smith in Pitt. Prim. 2: 17. 1898. Volcán de Irazú, *Oersted*. Endemic. Known only from Irazú, at 2,400–2,700 meters. A glabrous shrub 4 meters high; leaves pinnate, the 13–16 leaflets oblong-lanceolate, 5–9 cm. long, serrate, the teeth terminated by a short spine; racemes paniculate, the flowers yellow.

MENISPERMACEAE. Moonseed Family

Reference: Diels, Pflanzenreich IV. 94. 1910.

Scandent shrubs, rarely herbs or small trees; leaves alternate, commonly palmate-nerved, simple and entire (in the Costa Rican species), without stipules; flowers minute, dioecious, cymose, the cymes often racemose or paniculate; sepals free, imbricate; stamens of the same number as the petals or more numerous; ovary of 3 to many carpels, the carpels 1–2-ovulate; fruit of one or more 1-seeded drupes.—Other genera are represented in Central America, at least in Panama.

CISSAMPELOS L.

Scandent herbs or shrubs; leaves often peltate, broad; pistillate flowers with 4 sepals; ovary 1-carpellate; drupes usually pilose.—In Central America only these five species are known.

Cissampelos coriacea Standl., sp. nov.—Scandens, ramis gracilibus striatis breviter pallide pilosis vel subglabratis, internodiis valde elongatis; folia majuscula longe petiolata subcoriacea, petiolo gracili 3.5–6.5 cm. longo dense breviter piloso; lamina usque ad 7 mm. supra basin peltata vel saepe epeltata rotundato-cordata 9–14 cm. longa et fere aequilata, apice obtusa, rotundata vel acuta et linearicuspidata, cuspide ad 5 mm. longo, basi profunde lata cordata, supra sparse hirsuta vel glabrata, venulis prominulis arcte reticulatis, subtus subdense sed laxe griseo-tomentosa, e basi 9-nervia; cymae masculae axillares laxe multiflorae hirtellae, pedicellis filiformibus, bracteis minutis vel obsoletis, sepalis hirtellis.—Piedades Norte y Los Angeles de San Ramón, *Brenes 6720* (type in Herb. Field Mus.); Los Angeles de San Ramón (Finca Johanson), *Brenes 6126*.

Cissampelos fasciculata Benth. Region of La Palma and La Hondura, Prov. San José, 1,300–1,700 meters, and probably in other places. Nicaragua to South America. Leaves broadly ovate, not or very shortly peltate, somewhat pilose; bracts of the inflorescence very small or none; fruit red.

Cissampelos grandifolia Triana & Planch. Reported for the tierra caliente. Ranging to Colombia and Honduras. Leaves peltate, broadly ovate or rounded, densely pilose; bracts of the inflorescence very small or obsolete.

Cissampelos Pareira L. *Bejuco azul, Venadera.* Thickets and hedges, Meseta Central to the Pacific coast, common in many places. A species of almost pantropic distribution. A small or large vine, the leaves broad, peltate, densely tomentose or sericeous, sometimes almost glabrous; bracts of the pistillate inflorescence reduced, those of the staminate inflorescence large and leaf-like; flowers green; fruits red or orange. In many parts of tropical America this plant has a high reputation for its supposed medicinal properties.

Cissampelos tropaeolifolia DC. Forests of the tierra caliente, at 600 meters or less. British Honduras to South America. A large, slender vine, almost glabrous; leaves peltate; bracts large and foliaceous in both the pistillate and staminate inflorescences.

HYPERBAENA Miers

Scandent shrubs, or trees; leaves coriaceous, not peltate; flowers small, green, the staminate with 6 sepals; ovary 3-carpellate.—Other species occur in Central America.

Hyperbaena panamensis Standl. Forests of the Atlantic tierra caliente, ascending to the region of Cartago; San Ramón. Also in Panama. A small or large vine; leaves oblong-ovate or ovate, 8–13 cm. long, acuminate, 5-nerved, sparsely pubescent on the lower surface.

Hyperbaena smilacina Standl. Journ. Wash. Acad. Sci. 15: 473. 1925. El Arenal, Guanacaste, 600 meters, *Juvenal Valerio 15.* Forests of the Atlantic coast, ascending to the region of El Muñeco; region of San Ramón, 1,200 meters. Endemic. A slender vine; leaves ovate or rounded-ovate, 7–9 cm. long, 5–7-nerved, short-acuminate, glabrous.

Hyperbaena Tonduzii Diels, Pflanzenreich IV. 94: 203. 1910. *Naranjo de monte.* Forests of the hills of Nicoya, *Tonduz 13793.* Also in Salvador. A medium-sized tree with rounded crown; leaves oblong or ovate, 9–12 cm. long, obtuse, glabrous; flowers white; fruits globose, yellow. In eastern Salvador this species is a tree of 6–10 meters, known by the names Cuero del diablo and Chaparrón.

Hyperbaena sp. At La Tejona, near Tilarán, we collected sterile specimens of a vine that probably belongs to this genus. It is distinguished from other Costa Rican species by having very broad leaves, densely velvety-pilose on the lower surface.

MAGNOLIACEAE. Magnolia Family

Trees or shrubs; leaves alternate, entire, the stipules caducous or none; flowers showy, perfect, the sepals and petals in 3 or more series, imbricate; stamens numerous; ovary usually composed of numerous carpels, these in fruit opening by 2 valves.—All the Central American genera are represented in Costa Rica.

DRIMYS Forst.

In North America there exists a single species of this genus.

Drimys Winteri Forst. *Quiebra-muelas, Muelo, Chile.* Forests of the central mountains, at 1,800–2,300 meters; region of San Ramón, at 1,100–1,200 meters. Mexico to South America. A glabrous shrub or tree of 3–10 meters, the bark gray; leaves petiolate, oblong or oblong-ovate, 7–13 cm. long, obtuse, coriaceous, whitish beneath; flowers axillary, white, 1.5 cm. broad. The bark is aromatic and very pungent. In country regions it is chewed to alleviate toothache, and an infusion is taken as a remedy for stomach affections. In addition, the bark has antiscorbutic properties and was employed formerly in medicine under the name Winter's bark.

MAGNOLIA L. Magnolia

Another Central American species grows in the mountains of Guatemala.

Magnolia grandiflora L. *Magnolia.* Planted and flowering in gardens at San José. Native of southeastern United States. A tree with dense, spreading crown, the handsome leaves deep green, leathery, lustrous on the upper surface, the large flowers white and fragrant.

Magnolia Kobus Thunb. Planted in the Jardinería Clausen in San José and flowering. Native of Japan. A shrub or small tree with thin, deciduous leaves, the flowers white.

Magnolia poasana (Pittier) Dandy, Kew Bull. 263. 1927. *Candelillo. Talauma poasana* Pittier, Contr. U. S. Nat. Herb. 13: 93. 1910. La Quesera, Volcán de Poás, 2,300 meters, *Pittier 2043.* Slopes of the central volcanoes and mountains of Dota, 1,200–2,300 meters. Endemic. A glabrous tree as much as 35 meters high; leaves elliptic, petiolate, acute or obtuse, coriaceous, with large stipules; flowers terminal, white, stalked, the petals about 7 cm. long. The large flowers are unusually showy and beautiful. The tree is abundant on the upper slopes of Poás.

TALAUMA Juss.

Three other species are known from the mountains of Central America.

Talauma gloriensis Pittier, Contr. U. S. Nat. Herb. 13: 94. 1910. La Gloria, Río Reventazón, *Pittier 16362.* Valley of the Reventazón, 1,000 meters. Endemic. A glabrous, medium-sized tree; leaves petiolate, elliptic, obtuse or short-acuminate, coriaceous; stipules deciduous; flowers pedunculate, white, very large, with 6 petals. Herbarium specimens of this tree are very much like those of *Magnolia poasana.* In *Talauma* the petiole bears a scar left by the base of the caducous stipule; in *Magnolia* such a scar is absent.

ANNONACEAE. Custard-apple Family

Trees or shrubs, the leaves alternate, entire, without stipules; flowers solitary or fasciculate, commonly perfect, generally with 3 sepals and 6 petals, these fleshy or coriaceous; stamens numerous; fruit of one or more carpels, these sessile or stipitate, generally fleshy, free or united to form a multicellular fruit.—A few other genera have representatives in Central America.

ANAXAGOREA St. Hil.

Two other species are native in Central America.

Anaxagorea costaricensis Fries, Act. Hort. Berg. 12: 25. *f. 1, h.* 1934. Pejivalle, Prov. Cartago, 900 meters, *Standley & Valerio 47014.* Also near El Cairo, Prov. Limón; in wet forest. Endemic. A shrub or tree of 5 meters; leaves petiolate, oblong-lanceolate, 25–30 cm. long, almost glabrous, acuminate; sepals lanceolate, 4 mm. long; carpels of the fruit 2 cm. long, dehiscent.

ANNONA L.

Reference: R. E. Fries, Acta Hort. Berg. 10: 197–315. 1931.

Trees or shrubs; leaves chiefly deciduous, short-petiolate; flowers solitary or fasciculate, extra-axillary; petals 6, in 2 series, the inner ones sometimes reduced or absent; carpels numerous, 1-ovulate; fruit a syncarp, the carpels coalescent to form a fleshy mass.—About 17 species are known from Central America.

Annona Cherimolia Mill. *Chirimoya.* Cultivated commonly, also naturalized in many parts of the temperate region and the Pacific coast. Probably not native in Central America, although this is not certain; cultivated commonly in tropical America. A small tree; leaves ovate or oval, obtuse, densely pilose beneath; flowers narrow, tomentose, greenish yellow; fruit ovoid or globose, almost smooth or with concave or somewhat elevated areoles. The fruits are variable in shape and size, and of superior quality.

Annona glabra L. *Guanábana silvestre.* Region of Limón, and doubtless frequent along the Atlantic coast; growing commonly in swamps or along streams. Widely distributed in tropical America. A shrub or small tree; leaves oval to oblong or ovate, acute or acuminate; flowers globose, the outer petals yellowish; fruit ovoid, almost smooth and yellowish at maturity, 5–12 cm. long, with cream-colored, inedible pulp. The wood is soft, very light in weight, brown, and weak.

Annona holosericea Safford, Contr. U. S. Nat. Herb. 16: 269. *pl. 90, 91.* 1913. *Anonillo de cerro.* Forests of the hills of Nicoya, *Tonduz 13930.* Endemic. A small tree; leaves elliptic or rounded, rounded at the apex, tomentose; flowers globose, tomentose, with only 3 petals.

Annona muricata L. *Guanábana.* Cultivated commonly in the tierra caliente, and perhaps naturalized in some localities. Native

of tropical America. A small tree, the leaves with a characteristic, aromatic odor, oblong-obovate or elliptic, glabrous, acute; flowers large, globose, the petals very broad; fruit large, globose or ovoid, covered with soft spines. The fruits often are borne on the trunk of the tree. Their pulp is white, slightly acidulous, and with a most agreeable flavor. It is employed principally in preparation of beverages or for flavoring ices. An infusion of the leaves is a household remedy for dysentery. The following Indian names are reported: Tsa, Tso-uo (Bribrí), Gsós-krá (Brunka), Shós-rí (Térraba).

Annona Pittieri Donn. Smith, Bot. Gaz. 24: 389. 1897. Platanillo, road to Cañas Gordas, 1,100 meters, *Pittier 11108*. Region of San Ramón. Endemic. A tree of 6–8 meters; leaves oblong, 16–18 cm. long, acuminate, glabrous; flowers narrow, the 3 petals 3.3 cm. long; fruit somewhat conic in form, 10–12 cm. long, with a thick rind, the areoles of the surface separated by elevated lines.

Annona purpurea Mociño & Sessé. *Soncoya.* Common in the Pacific tierra caliente. Mexico to Venezuela. A medium-sized tree; leaves almost sessile, elliptic or oblong, large, acuminate, tomentulose; flowers globose, purple-brown, very large, the petals thick; fruit globose or ovoid, large, covered with thick, pyramidal protuberances and with a brown felt. The fruit is of inferior quality, and among the country people it has the reputation of being "unhealthy."

Annona reticulata L. *Anona, Anón, Anonillo.* Cultivated everywhere in the temperate region where there is a well marked dry season, and wild in many places. Widely distributed in tropical America. A small tree; leaves lanceolate, acuminate, almost glabrous; flowers narrow, green or yellowish, sericeous; fruit ovoid-globose, smooth, the outline of the areoles scarcely perceptible, the flesh fragrant, white. One of the most popular fruits of Central America because of the superior quality of its deliciously flavored flesh. The pulp is applied as poultice to reduce the inflammation of sores and to bring boils to a head, and the powdered seeds are applied to kill lice. The bark contains a strong fiber, and it is said that the leaves give a blue or black dye. Indian names reported are: Sho (Cabécara), Gshós-rit-krá (Brunka), Uisíro (Guatuso).

Annona squamosa L. *Anón.* Cultivated in some places. Widely dispersed in America in cultivation, but it is not known where it is native. A small tree, the leaves lanceolate, acuminate, pubescent or almost glabrous; flowers narrow, greenish yellow; fruit composed of

numerous carpels that are rounded at the apex and only lightly coherent. The fruit is of superior quality and much in demand in regions where the tree is cultivated.

CYMBOPETALUM Benth.

Two or three other species are known from Central America.

Cymbopetalum costaricense (Donn. Smith) Fries, Act. Hort. Berg. 10: 186. *f. 6.* 1931. *Asimina costaricensis* Donn. Smith, Bot. Gaz. 23: 2. 1897. Sipurio, Talamanca, 100 meters, *Tonduz 8709.* Forests of the Atlantic coast, at 650 meters or less. Endemic. A small tree; leaves oblong or obovate, 10–22 cm. long, acuminate, glabrous; flowers supra-axillary; petals 6, tomentulose, broadly ovate, acute; the inner ones 17 mm. long; fruit of 8–10 stipitate carpels 3–5 cm. long. The petals of a Guatemalan species were employed formerly by the Indians, and are still used in some regions, for giving a distinctive flavor to chocolate.

DESMOPSIS Safford

Reference: Fries, Acta Hort. Berg. 10: 16–28. 1930.

Shrubs or medium-sized trees; flowers medium-sized, yellowish green, the pedicels usually elongate, bibracteate; sepals valvate; petals 6, subequal, valvate in 2 series; fruit of 7–20 stipitate, globose or ovoid carpels.—Other species are known from Central America.

Desmopsis bibracteata (Robinson) Safford. *Guineo.* Nuestro Amo, 500 meters, and probably elsewhere. Guatemala to Panama; Cuba. A small tree, the leaves oblong-lanceolate or elliptic, at first hirsute, glabrous at maturity, obtuse or rounded at the apex; petals oblong, 10–18 mm. long; carpels subglobose, 5–10 mm. long.

Desmopsis heteropetala Fries, Act. Hort. Berg. 10: 316. 1931. Forests of El Tablazo, *Pittier 7967.* Endemic. Leaves elliptic-obovate, acuminate, 20–30 cm. long, glabrous; inner petals linear-oblong, 15 mm. long.

Desmopsis microcarpa Fries, Act. Hort. Berg. 10: 23. 1930. Coast between Limón and Moin, *Pittier 16014.* Endemic. A shrub of 2–3 meters; leaves elliptic, rounded at the apex and short-acuminate, 10–20 cm. long, almost glabrous; petals yellowish, narrowly lanceolate, 2 cm. long.

Desmopsis Oerstedii Safford, Bull. Torrey Club 43: 191. 1916. *Guineo.* Aguacate, *Oersted 148.* Also at Jarís. Endemic. Leaves

elliptic-lanceolate, obtuse, hirsute beneath; carpels ovoid, 12–24 mm. long.

GUATTERIA Ruiz & Pavón

Shrubs or small trees, the leaves large or small; flowers axillary, solitary or fasciculate, more or less pubescent, the petals imbricate; carpels of the fruit stipitate.—Other species occur elsewhere in Central America.

Guatteria aeruginosa Standl. Region of El General. Panama. A tree of 15 meters, the trunk as much as 45 cm. in diameter; leaves almost sessile, narrowly oblong or oblanceolate-oblong, 12–16 cm. long, 4–5.5 cm. wide, abruptly short-acuminate, obtuse at the base, ferruginous-pilose beneath, especially along the nerves; flowers axillary on 1-flowered peduncles; outer petals broadly ovate or elliptic, 8 mm. long, densely sericeous; berries long-stipitate, narrowly ellipsoid, 10–12 mm. long.

Guatteria amplifolia Triana & Planch. Forests of the Atlantic tierra caliente. British Honduras to Colombia. A shrub or small tree, the leaves oblong or elliptic, 20–30 cm. long, acuminate, almost glabrous; flowers large, green or yellowish, the petals fleshy; carpels numerous, the stipes elongate and red.

Guatteria dolichopoda Donn. Smith, Bot. Gaz. 23: 2. 1897. Forests of Shirores, Talamanca, 100 meters, *Pittier & Tonduz 9166*. Also at Cañas Gordas, 1,100 meters. Endemic. A tree of 6 meters, the leaves lance-oblong, 12–18 cm. long, acuminate, glabrous when fully developed; petals sericeous, oblong or ovate, 2 cm. long; carpels 30–50, about 8 mm. long, the stipes red.

Guatteria oliviformis Donn. Smith, Bot. Gaz. 23: 1. 1897. *Anonillo*. Forests of Río Segundo, Volcán de Barba, 1,900 meters, *Tonduz 1740*. Also Páramos del Abejonal, 1,500 meters; region of San Ramón, at 800–1,200 meters. Endemic. A shrub or small tree, sometimes 8 meters high, the leaves oblong-elliptic, 10–18 cm. long, acute, pubescent beneath; petals pubescent, obtuse, 1 cm. long; carpels about 20.

Guatteria Tonduzii Diels, Notizbl. Bot. Gart. Berlin 11: 75. 1931. Cerros del Tremendal near San Ramón, 1,400 meters, *Tonduz 17680*. Regions of San Ramón and the Reventazón, 1,000–1,500 meters. Endemic. A shrub or tree of 4–8 meters; leaves oblong, 8–15 cm. long, acuminate, sparsely sericeous beneath; petals 2 cm. long, pilose.

MALMEA Fries

Other species of the genus are native in Central America.

Malmea costaricensis Fries, Act. Hort. Berg. 10: 320. 1931. Río Coto, Golfo Dulce, *Pittier 6969*. Endemic. Leaves lanceolate, attenuate, 12–18 cm. long, glabrous; peduncles terminal or opposite the leaves; sepals rounded-ovate, hirsute; petals fleshy, glabrous, rounded at the apex, 2–2.5 cm. long. This plant has been reported from Costa Rica as *Duguetia leiophylla* Donn. Smith.

ROLLINIA St. Hil.

Reference: Fries, Act. Hort. Berg. 12: 112–190. 1934.

Trees or shrubs; flowers solitary or fasciculate, the pedicels bracteate at the base; sepals valvate; petals 6, in 2 series, valvate, the inner ones minute, the outer ones provided with a compressed dorsal wing or with a spur-like appendage; carpels numerous, lightly coherent and forming a large syncarp.—Other species occur in Central America.

Rollinia Danforthii Standl., sp. nov.—Arbor 13-metralis, ramulis gracilibus subteretibus dense minute elevato-lenticellatis dense minute brunneo-puberulis, internodiis elongatis; folia majuscula breviter petiolata crasse membranacea, petiolo crassiusculo ca. 1.5 cm. longo dense minute brunneo-puberulo-tomentuloso; lamina late ovalis 15.5–18 cm. longa 9–9.5 cm. lata, apice late rotundata et abrupte in cuspidem angustum 8–10 mm. longum contracta, basi rotundata, supra in sicco fusca opaca sparse minute villosula, nervis non elevatis, subtus brunnescens ubique pilis brevibus brunneo-sericea, costa gracili elevata, nervis lateralibus utroque latere ca. 27 approximatis teneris prominentibus subarcuatis in marginem desinentibus, venulis obscuris; pedunculi uniflori crassi 1.5–2.5 cm. longi dense brunneo-tomentulosi; calyx ca. 7 mm. latus brevis, dense brunneo-sericeus, sepalis multo latioribus quam longis apice breviter triangulari-apiculatis; corollae tubus ca. 5 mm. longus atque 8 mm. latus, alis divaricatis ovali-obovatis 1.5 mm. longis 8 mm. altis apice late rotundatis extus densissime pilis brevissimis brunneo-sericeis; stamina numerosissima capitulum 6 mm. latum efformantia, filamentis crassiusculis dense ochraceo-pilosulis.—San Isidro de El General, August, 1936, *Ralph E. Danforth 30* (type in Herb. Field Mus.).

Rollinia Jimenezii Safford, Journ. Wash. Acad. Sci. 6: 378. *f. 3*. 1916. Nuestro Amo, Prov. Alajuela, 500 meters, *Otón Jiménez*

427. Pacific tierra caliente, ascending to 1,200 meters. Ranging to southern Mexico. A medium-sized tree; leaves obovate, 10–24 cm. long, acuminate, pilose beneath; flowers tomentose, 2 cm. broad; fruit globose, 6–10 cm. long. The fruit is edible. In Panama this species is known by the name Torete.

Rollinia microsepala Standl. Field Mus. Bot. 4: 208. 1929. Río Changuinola, *Cooper & Slater 102*. Also in San Carlos. A tree, the leaves oblong, acuminate, 10–18 cm. long, sericeous beneath; corolla tomentulose, the wings 15–18 mm. long; fruit globose, about 1.5 cm. broad, almost smooth.

Rollinia Standleyi Fries, Act. Hort. Berg. 12: 128. 1934. Tilarán, Guanacaste, 500–700 meters, *Standley & Valerio 45920*. Endemic; known only from the region of the type. A tree of 10 meters; leaves elliptic, 10–20 cm. long, acuminate, tomentose beneath; corolla tomentose, 1.5 cm. broad, the wings 5–7 mm. long.

SAPRANTHUS Seem.

Reference: Fries, Act. Hort. Berg. 10: 3–15. 1930.

Shrubs or medium-sized trees; flowers large or medium-sized, solitary and opposite the leaves or inserted on the trunk or branches; sepals imbricate; petals 2-seriate, imbricate, somewhat pubescent; fruit of few or numerous stipitate or almost sessile carpels, containing numerous seeds.—In Central America there are two other species, one of which (*S. nicaraguensis* Seem.) may extend to Costa Rica.

Sapranthus microcarpus (Donn. Smith) Fries. *Guineo*. Forest and thickets of the Pacific tierra caliente; ascending to 1,100 meters about San Ramón. Ranging to southern Mexico. A shrub or tree of 2–6 meters; leaves obovate or oblong, 6–10 cm. long, almost glabrous, obtuse or acuminate; flowers opposite the leaves, yellow, the petals narrowly oblong, 1.5–2 cm. long; carpels small, stipitate, purple.

Sapranthus Palanga Fries, Act. Hort. Berg. 10: 12. 1930. *Palanco*. Guanacaste, *Oersted 138*. Thickets and forests of the Pacific tierra caliente, at 700 meters or less. Also in Nicaragua. A small or medium-sized tree; leaves elliptic, 15–30 cm. long, rounded to acuminate at the apex, densely pilose; flowers arising from the trunk or larger branches, pendent, at first green, later reddish brown, the petals oblong, 5–6 cm. long; carpels 3 cm. long. The large flowers are rather showy but of a color that is curious rather than beautiful.

They exhale a strong and disgusting odor, suggestive of carrion. The bark contains a strong fiber. The wood is white and soft.

XYLOPIA L.

Reference: Fries, Act. Hort. Berg. 10: 86–214. 1930.

Shrubs or small trees; leaves short-petiolate, narrow, distichous; flowers fasciculate, axillary, whitish, the petals linear or oblong, erect and connivent in flower; carpels of the fruit dehiscent along one side.—Another Central American species is found in Panama.

Xylopia aromatica (Lam.) Mart. Forests of the Atlantic coast. Nicaragua to Paraguay. A shrub or small tree; leaves oblong-lanceolate, acuminate, coriaceous, sericeous beneath, 2–3.5 cm. wide; flowers 2.5 cm. long. This species is known in Panama by the name Malagueto macho.

Xylopia frutescens Aubl. *Majagua, Malagueta.* Region of El General, and probably in the Atlantic coast. British Honduras to Brazil. A shrub with slender, elongate branches; leaves 1–1.5 cm. wide; flowers 1 cm. long. The Térraba name is reported as Trup-kró.

MYRISTICACEAE. Nutmeg Family

Trees, the leaves alternate, simple, entire, without stipules; inflorescence generally axillary, paniculate or racemose, the flowers dioecious, apetalous; perianth inferior, usually trilobate, the lobes valvate; stamens 2–30, the filaments united; style none, the stigmas 2; ovule 1; fruit bivalvate, the pericarp fleshy or woody; seed surrounded by a branched aril.—All the Central American genera are represented in Costa Rica.

COMPSONEURA Warb.

A single species is known from Central America.

Compsoneura Sprucei (A. DC.) Warb. *C. costaricensis* Warb. Repert. Sp. Nov. 1: 71. 1905 (San Carlos, *Koschny*). Common in forests of the tierra caliente, especially near the Atlantic, ascending to the region of Dota. Mexico to Brazil. A shrub or small tree, glabrous; leaves oblong, 10–25 cm. long, short-acuminate, the petioles very short; flowers minute, fasciculate, in short racemes, the perianth 1.5 mm. long; fruit oval, 2.5–3 cm. long, yellow, the aril pale yellow.

DIALYANTHERA Warb.

Trees with glabrous, coriaceous leaves; inflorescence racemose, the flowers minute, fasciculate, pedicellate; fruit globose, the aril laciniate.—Two other species are found in Central America.

Dialyanthera acuminata Standl. Forests of Pejivalle. Also in Panama. A tall tree, the leaves oblong-elliptic, 7–12 cm. long, narrowly acuminate.

Dialyanthera Otoba (Humb. & Bonpl.) Warb. *Sebo.* Forests of the Atlantic tierra caliente, at 670 meters or less. Ranging to Peru. A very tall tree, the leaves elliptic, 15–20 cm. long, obtuse or acute, pale beneath; racemes somewhat sericeous, the flowers yellow, 4 mm. long; fruits 2–2.5 cm. long.

MYRISTICA L.

Myristica fragrans Houtt. *Nuez moscada.* The nutmeg, native of the East Indies, is in cultivation in the region of Limón. It is a handsome tree, extensively planted in some tropical regions for its highly aromatic seeds.

VIROLA Aubl.

Tall trees, the leaves tomentose beneath, at least when young; flowers minute, paniculate, fasciculate along the branches; pericarp woody, the seed brown, lustrous, enveloped in a laciniate aril.—There are probably 7 species in Central America. The seed is similar to that of the nutmeg but the seeds of the Central American trees are not aromatic like the nutmeg. They are handsome because of their shape and the delicate, lace-like aril surrounding them.

Virola Koschnyi Warb. Repert. Sp. Nov. 1: 71. 1905. *Fruta dorada.* San Carlos, *Koschny.* Collected also at El Rosario de Orosi, 1,120 meters. Panama to Guatemala. Leaves short-petiolate, oblong or lance-oblong, 10–22 cm. long, short-acuminate, somewhat cordate at the base, with 20–35 pairs of nerves; seeds 2–2.5 cm. long.

Virola sebifera Aubl. *V. panamensis* Warb. Forests of the Atlantic coast. Nicaragua to Brazil. A tall tree; leaves 14–30 cm. long, pale beneath, with 10–15 pairs of nerves; fruit 2–3 cm. long. The wood of these Central American trees is pale brown, light in weight, easy to work, and not durable. It is little used but in some regions it is employed for construction. The species of *Virola* are known in Panama by the name Bogamani.

MONIMIACEAE

Reference: Perkins & Gilg, Pflanzenreich IV. 101. 1901; 1911.

Shrubs or small trees, the leaves opposite, entire or dentate, without stipules, the petioles usually short; flowers small, unisexual, monoecious or dioecious, usually in cymes or axillary fascicles; recep-

tacle campanulate to urceolate, fleshy; sepals 4 to many; stamens few or numerous; ovule 1; fruit drupaceous, the receptacle often accrescent and fleshy.—In Central America there occur only two genera.

MOLLINEDIA Ruiz & Pavón

Leaves entire or dentate, short-petiolate; flowers dioecious, paniculate or racemose; sepals 4; stamens 8–50, the anthers dehiscent by longitudinal slits; drupes numerous, sessile or stipitate.—About 5 species are known from Central America.

Mollinedia costaricensis Donn. Smith, Bot. Gaz. 33: 257. 1902. *Limoncillo.* La Emilia, Llanuras de Santa Clara, 250 meters, *J. D. Smith 6760.* Forests of the Atlantic tierra caliente, ascending to 1,100 meters; also in the mountains of Guanacaste and the region of San Ramón. Endemic. A shrub or tree of 6 meters or less; leaves obovate, 7–13 cm. long, rounded or short-acuminate at the apex, acute at the base, entire or sparsely dentate, somewhat pubescent beneath; drupes 1.5 cm. long.

Mollinedia Pinchotiana Perkins, Bot. Jahrb. 31: 743. 1902. La Palma, 1,520 meters, *Tonduz 12345.* Forests of the central region, 1,000–1,600 meters. Endemic. A shrub or tree of 6 meters or less; leaves obovate-oblong, acuminate, attenuate to the base, obscurely dentate. For this species I once was given the local name Quizarrá, but probably in error, since the name is applied ordinarily to species of Lauraceae.

SIPARUNA Aubl.

Shrubs or small trees, the leaves opposite or rarely verticillate, entire or dentate, petiolate; flowers in axillary cymes; anthers dehiscent by valves; carpels 4–20, the drupes globose.—In Central America there are about a dozen species of the genus. The leaves have a strong and characteristic odor, much like that of lemon.

Siparuna chrysothrix Perkins, Bot. Jahrb. 31: 746. 1902. Forests of Térraba, 260 meters, *Tonduz 3985.* Endemic. Leaves obovate, 10–13 cm. long, entire, densely pilose beneath with stellate hairs.

Siparuna grisea Perkins, Bot. Jahrb. 31: 747. 1902. Forests of the Río Naranjo, 200–250 meters, *Tonduz 7545.* Ascending the slopes of the central volcanoes to 1,500 meters. Endemic. A shrub of 2–3 meters; leaves obovate-oblong, 10–17 cm. long, denticulate, pubescent.

Siparuna griseo-flavescens Perkins, Bot. Jahrb. 28: 693. 1901. Forests of Juan Viñas, 1,130 meters, *Pittier 1879*. Forests of the central region and valley of the Reventazón, 450–1,600 meters; mountains of Guanacaste; Osa; San Ramón. Also in Panama. A shrub of 2–3 meters; leaves oblong or obovate-oblong, 8–17 cm. long, acuminate, denticulate or entire, densely and softly pubescent; fruits red.

Siparuna guianensis Aubl. Forests of the tierra caliente. Ranging to Bolivia. A monoecious shrub; leaves oblong-elliptic, acuminate, entire, almost glabrous.

Siparuna nicaraguensis Hemsl. *Limoncillo*. Forests of the Atlantic coast, ascending the slopes of the volcanoes to 1,500 meters; region of San Ramón. Panama to Mexico. A shrub of 2–5 meters; leaves elliptic to oblong, acuminate, entire or somewhat serrate, sparsely pilose on the lower surface; flowers yellowish green; fruits reddish.

Siparuna paralleloneura Perkins, Bot. Jahrb. 28: 688. 1901. Turrialba, *Oersted*. Forests of the central volcanoes, 1,200–2,000 meters. Endemic. A shrub of 2–5 meters; leaves ovate or obovate, 8–14 cm. long, short-acuminate, rounded at the base, denticulate, pubescent on the lower surface; fruits 1 cm. long, dark red.

Siparuna patelliformis Perkins, Bot. Jahrb. 28: 692. 1901. *Limoncillo*. Turrialba, *Oersted*. Forests of the tierra caliente, ascending the slopes of the volcanoes to 1,800 meters; region of Dota; San Ramón. Endemic. A shrub or small tree of 2–6 meters; leaves obovate or ovate, 10–25 cm. long, acuminate, rounded at the base, undulate or denticulate, densely tomentose; flowers green; fruit globose, 1 cm. long, reddish green.

Siparuna pauciflora (Beurl.) A. DC. *Limoncillo*. Forests of the Atlantic coast, ascending to Pejivalle, at 900 meters or less; San Ramón, at 1,200 meters. Panama to Peru. A shrub of 2–5 meters; leaves obovate, 15–30 cm. long, acute at the base, serrulate, finely tomentose beneath; flowers green.

Siparuna tetraceroides Perkins, Bot. Jahrb. 28: 689. 1901. *Limoncillo*. Type collected by Oersted, without indication of the exact locality. Forests of the Atlantic slopes of the central volcanoes, 800–1,600 meters. Endemic. A shrub of 3–5 meters; leaves elliptic or obovate, 6–16 cm. long, rounded or acute at the base, denticulate, densely pubescent beneath; fruits red.

Siparuna Tonduziana Perkins, Bot. Jahrb. 31: 746. 1902. Las Vueltas, Tucurrique, 635 meters, *Tonduz 12766*. Forests of the Atlantic plains, ascending to the region of Dota, 0–1,900 meters; Guanacaste; San Ramón. Honduras to Panama. A shrub of 1–3 meters; leaves oblong to obovate, 11–30 cm. long, rounded or cordate at the base, coarsely dentate, pubescent; fruits red, globose, 1 cm. long.

LAURACEAE. Laurel Family

Reference: Mez, Jahrb. Bot. Gart. Berlin 5. 1889.

Trees or shrubs, rarely herbs (in *Cassytha*), evergreen, the leaves alternate, punctate, without stipules, entire; flowers perfect or unisexual, small, green or yellowish, usually cymose, umbellate, or capitate; perianth commonly 6-lobate; petals none; stamens and staminodia normally twice as many as the perianth segments, in 2 or 4 series; anthers erect, 2- or 4-celled; fruit drupaceous or baccate, 1-seeded.—One of the largest families of tropical America, well represented in Costa Rica, some of the trees being of considerable importance as a source of lumber. The differences between the genera are found in the stamens, and it is difficult to distinguish them. The leaves are much alike in all the groups and the fruits give no differential characters. Fruiting specimens can be determined only by comparison with authentically named flowering specimens, and even then often with much uncertainty.

BELLOTA Gay

The other species of the genus are South American.

Bellota costaricensis Mez, Jahrb. Bot. Gart. Berlin 5: 27. 1889. *Quizarrá. Boldus costaricensis* Kuntze, Rev. Gen. 569. 1891. Without locality, *Hoffmann 857*. Forests of the slopes of the central volcanoes, 1,700–2,400 meters; region of San Ramón. Endemic. A shrub or tree of 3.5–10 meters; leaves oblong or obovate-oblong, coriaceous, obtuse or rounded at the apex, glabrous, the petioles very short; flowers yellow, cymose, the pedicels elongate; fruits oblong, 13 mm. long.

CASSYTHA L.

The genus consists of a single species.

Cassytha filiformis L. Atlantic coast, and probably also on the Pacific. A plant of pantropic distribution. A yellow, parasitic herb, the leaves reduced to scales. In habit and general appearance

the plant is much like species of *Cuscuta* (Convolvulaceae), and quite unlike other groups of Lauraceae.

CINNAMOMUM L.

Cinnamomum Camphora (L.) Nees & Eberm. *Alcanfor.* Sometimes planted as an ornamental tree. Native of China and Japan. From this tree is obtained the drug camphor, most of the supply coming at present from the island of Formosa.

Cinnamomum zeylanicum Nees. *Canela.* Sometimes planted as an ornamental tree. Native of India. The dried bark is the cinnamon of commerce.

HUFELANDIA Nees

Trees, more or less pubescent or sometimes glabrous; leaves sometimes subopposite, coriaceous; flowers small, perfect, paniculate, the panicles axillary; perianth segments almost equal; perfect stamens 9, the anthers 2-celled.—Other species are known from Central America, one of them (*H. Anay* Blake), the Anay of Guatemala, producing an edible fruit similar to the aguacate or avocado.

Hufelandia costaricensis Mez & Pittier, Bull. Herb. Boiss. II. 3: 228. 1903. *Quizarrá.* Forests of Juan Viñas, 1,100 meters, *Pittier 1863.* Also in forests of Cantón de Dota, 1,800 meters. Endemic. An almost glabrous tree; leaves elliptic, 11–23 cm. long, green beneath.

Hufelandia ovalis Blake, Journ. Wash. Acad. Sci. 9: 461. 1919. Volcán de Poás, 2,600 meters, *Pittier 2040.* Endemic. A medium-sized tree; leaves oval, 6–8 cm. long, whitish beneath.

LITSEA Lam.

Another Central American species is found in Guatemala and Salvador.

Litsea flavescens Bartlett, Proc. Amer. Acad. 44: 599. 1909. *Lentisco.* Cerros de Belmira, near Santa María de Dota, 1,800 meters, *Tonduz 11638.* Forests of the region of Dota, 1,500–1,800 meters, and perhaps elsewhere. Endemic. A tree of 4–6 meters, glabrous; leaves lanceolate, about 2 cm. wide, attenuate; flowers yellowish, in small, axillary, pedunculate heads. Easy to recognize because of the small, narrow leaves and the capitate flowers. Reported by Mez as *L. glaucescens* var. *subsolitaria.* The leaves are aromatic. Those of the Mexican species are much used for flavoring food.

MISANTECA Schlecht. & Cham.

Two other species occur in Central America.

Misanteca Pittieri Mez, Bull. Herb. Boiss. II. 3: 230. 1903. *Quizarrá. M. costaricensis* I. M. Johnston, Contr. Gray Herb. 70: 70. 1924 (Cerros de Santiago, near San Ramón, *Brenes 14403*). Hacienda de Belmira, near Santa María de Dota, 1,450 meters, *Tonduz 11613*. Forests of the central region, 1,100–1,500 meters. Endemic. A tree of 8–10 meters, or sometimes only a shrub; leaves elliptic-oblong or obovate-oblong, 10–14 cm. long, short-acuminate, acute at the base, coriaceous, glabrous; flowers small, in very dense, pubescent panicles; cupule of the fruit as much as 2 cm. broad.

NECTANDRA Roland

Trees; leaves coriaceous; flowers cymose, in axillary or terminal panicles; perianth 6-lobate, the segments equal; perfect stamens 9, the anthers 4-celled.—A large genus, well represented in Central America. Many of the species yield good wood that is used locally for construction.

Nectandra concinna Nees. Forests of the Pacific tierra caliente and in the Atlantic coast, ascending to 1,400 meters; region of San Ramón. Mexico to South America. A large or small tree, sometimes flowering when only a shrub; leaves oblong to elliptic, glabrous, acuminate; flowers white or yellowish.

Nectandra glabrescens Benth. *Quizarrá, Quina, Quizarrá quina, Aguacatillo, Sigua amarillo.* Forests of the Atlantic tierra caliente, ascending the slopes of the volcanoes to 2,250 meters; region of San Ramón. Mexico to Colombia. A tall or medium-sized tree, sometimes 25 meters high; leaves lance-oblong, acuminate, glabrous. The wood of this species is used for construction.

Nectandra globosa (Aubl.) Mez. *Aguacatillo, Quizarrá quina, Quizarrá.* A common species of forests of the tierra caliente, ascending to 1,500 meters. Mexico to South America. A tall or medium-sized tree; leaves lance-oblong, acuminate, glabrous.

Nectandra membranacea (Swartz) Griseb. Region of San Ramón. Central America and West Indies. A small or medium-sized tree; leaves sparsely pilose or glabrous, ovate to elliptic-oblong, acute or acuminate, acute or subobtuse at the base, 12–20 cm. long; inflorescence tomentulose or glabrate, the flowers 4–5 mm. in diameter.

Nectandra nervosa Mez & Pittier, Bull. Herb. Boiss. II. 3: 235. 1903. Delta of Río Diquís, *Tonduz 6758*. Endemic. A tree, the leaves elliptic-lanceolate, glabrous.

Nectandra ramonensis Standl., sp. nov.—Ramuli crassiusculi teretes vel subangulati dense ochraceo-sericei vel serius glabrati, sat dense foliati; folia mediocria breviter petiolata coriacea in sicco brunnescentia vel fusca, petiolo ad 1 cm. longo sericeo-tomentuloso vel glabrato; lamina oblongo-elliptica vel ovato-elliptica 7–11.5 cm. longa 2.5–6 cm. lata sensim vel subabrupte acuminata, interdum acuta vel subobtusa, basi acuta vel acuminata, supra glabra lucida costa venisque vix impressis, subtus opaca primo ubique dense minute sericea serius glabrata, costa gracili elevata, nervis lateralibus utroque latere ca. 6 angulo recto vel angustiore adscendentibus, in axillis barbata; inflorescentiae paniculatae laxe multiflorae longipedunculatae foliis aequilongae vel breviores sparse sericeo-tomentulosae, pedicellis gracilibus ad 8 mm. longis; flores fere 4 mm. longi brunneo-tomentulosi, segmentis breviter connatis ovalibus vel late ellipticis apice obtusis vel rotundatis crassis.—San Francisco y San Pedro de San Ramón, *Brenes 17018* (type in Herb. Field Mus.); San Pedro de San Ramón, *Brenes 6660, 6612*.

Nectandra rectinervia Meissn. *Aguacatillo*. Common in forests of Guanacaste, also in the regions of Cartago and San Ramón, 500–1,200 meters. Mexico to Venezuela. A small or large tree; leaves very narrow, small, glabrous, lustrous; flowers yellowish white or greenish, almost glabrous.

Nectandra reticulata (Ruiz & Pavón) Mez. *Quizarrá*. Forests of the tierra caliente, ascending the slopes of the central mountains to 1,800 meters; region of San Ramón. Mexico to Peru. A tall or medium-sized tree; leaves lanceolate to ovate-oblong, large, attenuate, very thick, densely pilose beneath; flowers large, densely tomentose; ovary tomentose. It is said that this species furnishes lumber of good quality.

Nectandra sanguinea Rottb. *Ira rosa*. Forests of the tierra caliente, ascending the slopes of the central mountains to 1,500 meters. Mexico to northern South America. A large or small tree; leaves lanceolate to elliptic, glabrous; flowers sericeous, white or greenish; fruits purple.

Nectandra sinuata Mez. *Quizarrá, Quizarrá hediondo*. Forests of the tierra caliente, ascending to the region of San José and Cantón

de Dota; region of San Ramón. Ranging to southern Mexico. A tree of 5–15 meters; leaves large, oblong or oval, obtuse or acute, densely and softly pilose; flowers large, white or reddish; fruits 3 cm. long.

OCOTEA Aubl.

Trees or shrubs, the leaves coriaceous or almost membranaceous; flowers small, in axillary or subterminal panicles; perianth with 6 unequal segments; perfect stamens 9, the anthers 4-celled.—A large genus, represented in Central America by numerous species, many of which furnish good lumber.

Ocotea atirrensis Mez & Donn. Smith, Bot. Jahrb. 30: Beibl. 67: 18. 1901. *Quizarrá.* Atirro, Prov. Cartago, 700 meters, *J. D. Smith 4930.* Abundant in Guanacaste and the plains of the Atlantic coast, ascending the Atlantic slope to 1,500 meters; region of San Ramón. Endemic. A shrub of 3–5 meters; leaves 30 cm. long or larger, oblong or obovate, almost sessile, acuminate, glabrous; flowers small, greenish or yellowish, almost glabrous; fruits about 3 cm. long. A characteristic tree of almost the whole Atlantic tierra caliente, growing in high forest.

Ocotea Brenesii Standl., sp. nov.—Arbor 6–8-metralis, ramulis gracilibus plus minusve angulatis in statu juvenili sparse griseo-sericeis subdense foliatis; folia mediocria petiolata in sicco fusca subcoriacea, petiolo gracili 7–10 mm. longo sparse sericeo; lamina elliptica vel ovato-elliptica 8–12 cm. longa 3.5–6 cm. lata subabrupte obtuso-acuminata, basi obtusa vel subrotundata, supra lucida glabra, nervis subimpressis, subtus opaca in statu juvenili sparse strigosa cito glabrata, costa gracili elevata, nervis lateralibus utroque latere ca. 5 angulo semirecto adscendentibus; inflorescentia submultiflora racemiformis foliis paullo brevior sparse sericea, pedicellis 4–6 mm. longis, floribus fere glabris subglobosis 3.5 mm. longis, perianthii tubo subnullo; limbi segmenta late ovata vel elliptica obtusa; antherae subtrapeziformi-ovatae basi truncatae.—Cataratas de San Ramón, *Brenes 13653* (type in Herb. Field Mus.); La Palma de San Ramón, 1,250 meters, *Brenes 5535.*

Ocotea cernua (Nees) Mez. Forests of the tierra caliente. Panama to Mexico. A shrub or small tree, glabrous throughout; leaves elliptic, narrowly acuminate; panicles small, their branches usually reflexed, the flowers small, white; fruits black. It is said that the wood is white, fine-grained, and hard.

Ocotea Endresiana Mez, Jahrb. Bot. Gart. Berlin 5: 257. 1889. Without definite locality, *Endres 223*. Region of San Ramón. Endemic. Leaves sessile, rigid, almost glabrous, obovate, 12 cm. long; inflorescence subcorymbose, glabrous. Easily recognized by its coriaceous, essentially sessile leaves.

Ocotea insularis (Meisn.) Mez, Jahrb. Bot. Gart. Berlin 5: 271. 1889. *Phoebe insularis* Meisn. in DC. Prodr. 15, pt. 1: 33. 1864. Type collected on Cocos Island. Leaves short-petiolate, almost glabrous, obovate, acuminate; inflorescence pyramidal, equaling the leaves, tomentulose. Endemic.

Ocotea Ira Mez & Pittier, Bull. Herb. Boiss. II. 3: 232. 1903. *Ira*. Forests of Juan Viñas, 1,200 meters, *Tonduz 13399*. Also in the plains of Santa Clara, 200 meters. Endemic. A tree of 15–20 meters, the leaves obovate, about 17 cm. long, rounded or acuminate at the apex, glabrous; flowers pubescent; fruits 2 cm. long.

Ocotea mollifolia Mez & Pittier, Bull. Herb. Boiss. II. 3: 233. 1903. Hacienda Victoria, Zent, 200 meters, *Pittier 16031*. Endemic. Leaves elliptic, acuminate, short-petiolate, soft-pilose on the lower surface; flowers tomentose.

Ocotea palmana Mez & Donn. Smith, Bot. Gaz. 33: 258. 1902. *Ira mangle*. Forests of La Palma, Prov. San José, 1,500 meters, *Tonduz 12652*. Endemic. Known only from the type region. Leaves obovate, acute at the base, short-petiolate, rounded and short-acuminate at the apex, tomentulose on the lower surface; flowers tomentose.

Ocotea paradoxa Mez, Bot. Jahrb. 30: Beibl. 67: 16. 1901. Forests of Río Naranjo, 300 meters, *Tonduz 7648*. Endemic. Leaves elliptic, glabrous, short-acuminate; flowers pubescent.

Ocotea pedalifolia Mez, Bot. Jahrb. 30: Beibl. 67: 19. 1901. *Quizarrá barcino*. Forests of Shirores, Talamanca, 100 meters, *Pittier & Tonduz 9172*. Forests of the Atlantic tierra caliente. Endemic. Leaves obovate-elliptic, 30 cm. long or larger, glabrous, rounded at the base; flowers tomentulose.

Ocotea pentagona Mez, Bot. Jahrb. 30: Beibl. 67: 17. 1901. Río Naranjo, 250 meters, *Tonduz 7613*. Forests of the tierra caliente, ascending to 1,000 meters; region of San Ramón. Also in Panama. A tall or medium-sized tree; leaves elliptic to oblong or obovate, acuminate, glabrous; flowers glabrous.

Ocotea Quisara Mez & Donn. Smith, Bot. Gaz. 33: 259. 1902. *Quizarrá.* La Concepción, Llanuras de Santa Clara, 250 meters, *J. D. Smith 6756.* Forests of the Atlantic plains, 200–600 meters. Endemic. Leaves elliptic, 30 cm. long, glabrous, acuminate; flowers tomentulose.

Ocotea stenoneura Mez & Pittier, Bull. Herb. Boiss. II. 3: 233. 1903. *Quizarrá amarillo, Yaya.* Llanuras de Santa Clara, 200 meters, *Cooper 10217.* Atlantic plains, at 200–700 meters. Panama. A tall tree; leaves elliptic to oblong, acuminate, soft-pilose beneath; flowers large, tomentose.

Ocotea subsericea Standl., sp. nov.—Ramuli crassiusculi densissime ochraceo-sericei subangulati, vetustiores subteretes, internodiis elongatis; folia mediocria petiolata in statu adulto coriacea, juvenilia tenuia in sicco fusca membranacea, petiolo crassiusculo ad 12 mm. longo; lamina oblonga vel elliptico-oblonga 7–12 cm. longa 3–4.5 cm. lata acuta vel acuminata, basi acuta, juvenilis subdense ochraceo-sericea cito glabrata, supra lucida, nervis subimpressis, subtus opaca, costa gracili elevata, nervis lateralibus utroque latere ca. 7 irregularibus angulo semirecto adscendentibus prominentibus; inflorescentia racemiformis vel thyrsoideo-paniculata folio duplo brevior dense ochraceo-sericea pauciflora, pedicellis crassiusculis 2–4 mm. longis, ramis infimis apice flores paucos umbellatos gerentibus, floribus 3 mm. longis dense sericeis, segmentis ovatis acutiusculis; antherae trapeziformi-ovatae basi truncatae apice leviter emarginatae, filamentis latis glabris; ovarium glabrum.—La Palma de San Ramón, 1,250 meters, *Brenes 6789* (type in Herb. Field Mus.).

Ocotea tenera Mez & Donn. Smith, Bot. Gaz. 35: 6. 1903. *Quizarrá lantisco, Aguacatillo.* Turrialba, 570 meters, *Tonduz 8330.* Common in forests of the Atlantic tierra caliente, ascending to 1,400 meters; region of San Ramón; Guanacaste. Endemic. A shrub, or a tree of 6–15 meters; leaves elliptic to lance-oblong, only 10–12 cm. long, acuminate, glabrous; flowers very small, glabrous; fruits black.

Ocotea Tonduzii Standl., nom. nov. *Ira, Ira mangle, Ira amarillo. O. cuneata* Mez, Bot. Jahrb. 30: Beibl. 67: 17. 1901, non *O. cuneata* Gómez, 1894. Río Segundo, 2,000 meters, *Tonduz 1739.* Forests of the central region, at 1,000–2,050 meters. Endemic. A tree of 10–15 meters; leaves obovate, narrowly attenuate to the base, almost sessile, glabrous; flowers tomentulose. Pittier states

that the wood is yellow with dark stripes, rather fine-grained, strong and easy to work, and rarely attacked by insects.

Ocotea veraguensis (Meissn.) Mez. *Quizarrá, Canelo, Aguacatillo, Canelilla. Sassafridium veraguense* Meissn. Common in forests of the Pacific tierra caliente; Cantón de Dota, 1,500 meters; region of San Ramón. Panama to southern Mexico. A tall tree with gray bark having the odor of cinnamon; leaves oblong, glabrous, obtuse or subacute; flowers white, fragrant; fruits black. The wood is dark brown or almost black, moderately hard and heavy, easy to work, and durable. It is employed in some parts of the country for construction. The Térraba name is reported as Sing-uo-gró.

PERSEA Gaertn.

Trees with coriaceous leaves; flowers in axillary or subtermina panicles; perianth segments 6, the outer ones shorter; perfect stamens 9, the anthers 4-celled; fruits small or often very large.—Other species are known from Central America.

Persea americana Mill. *Aguacate. P. gratissima* Gaertn. Planted almost everywhere, and probably native in some regions, as in the forests of the Atlantic coast and the mountains of the central region. One of the most popular fruits of all parts of tropical America, and probably cultivated since the beginning of agriculture. In Costa Rica there are grown many varieties of the avocado differentiated by their shape, color, and flavor. The larger and handsome Aguacate de Cuba is grown in the coasts, its fruits attaining sometimes a weight of two kilograms. In the temperate regions are found smaller varieties, some with the form of a somewhat elongate pear, others spherical. The flesh of the avocado is of the consistency of butter, and contains a large amount of greenish fat. It is very agreeable to the taste, whether eaten simply with salt or made into salads. In some regions it is employed as a remedy for diseases of women, and also is reputed to have aphrodisiac properties. The latter belief is probably very ancient, and perhaps is an instance of the doctrine of signatures. The Nahuatl term for the fruit is *Ahuacatl,* a word signifying also testicle, and it is not known which is the primary meaning of the word. The wood is pale reddish brown, fine-grained, and easy to work, but susceptible to rot and insect attacks, and consequently unsuited for permanent construction. Among Indian names reported for the tree and its fruit are: Amó (Bribrí): Bukrá (Brunka); Dobor-kor (Térraba); Dikora, Sútuh, Súutu (Guatuso); Bucra, Buvo (Boruca); Hamó (Cabécara).

Persea Brenesii Standl., sp. nov.—Arbor 5–7-metralis, ramulis crassis angulatis densissime ochraceo-sericeis satis dense foliatis; folia parva petiolata coriacea, petiolo 10–14 mm. longo dense sericeo; lamina oblonga 5.5–7.5 cm. longa 1.5–2.5 cm. lata obtusa vel acutiuscula basi acuta, supra glabra costa nervisque subimpressis, subtus ubique densissime ochraceo-sericea, costa gracili elevata, nervis lateralibus utroque latere ca. 6 angulo recto vel angustiore adscendentibus; inflorescentiae axillares pauciflorae corymbosae foliis paullo longiores dense ochraceo-sericeae, floribus ad apices ramulorum sessilibus vel breviter crasse pedicellatis; sepala persistentia paullo inaequalia dense sericea basi in tubum brevem connata, exterioribus ovalibus vel ovatis, interioribus longioribus oblongo-ovatis obtusis usque ad 5 mm. longis; fructus ut videtur immaturus globosus glaber fere 1 cm. diam.—La Palma de San Ramón, 1,150 meters, *Brenes 4451* (type in Herb. Field Mus.). Growing, according to the collector, in either forest or pastures.

Persea caerulea (Ruiz & Pavón) Mez. *Aguacatillo.* Common in forests and pastures of the central region, descending to the Pacific coast, at 1,800 meters or less. Ranging to Peru. A tree of 5–15 meters; leaves elliptic to oblong, acuminate to obtuse, glabrous, sometimes pale on the lower surface; flowers large, yellowish; fruits small and globose.

Persea pallida Mez & Pittier, Bull. Herb. Boiss. II. 3: 231. 1903. Valle de Coto, Río Diquís, 1,400 meters, *Pittier 11111.* Endemic. Leaves elliptic, short-acuminate, somewhat pubescent and pale beneath; flowers tomentulose.

Persea Schiedeana Nees. *Yas. P. Pittieri* Mez, Bot. Jahrb. 30: Beibl. 67: 15. 1901 (Rancho Redondo, *Pittier 1156*). Common in forests of the central mountains, 1,400–1,900 meters. Panama to southern Mexico. A tall tree; leaves oval or obovate, rounded or cordate at the base, whitish and tomentose on the lower surface; flowers tomentose, greenish; fruits as large as a lemon, with a large seed and a thick rind in comparison with the amount of pulp that it encloses. The fruits are sold during their season in the markets of Cartago, and doubtless elsewhere, often bringing a comparatively high price. Because of the large amount of coarse fiber that they contain, they are not attractive in appearance and texture, but are of excellent flavor. The wood is strong but soon attacked by insects.

PHOEBE Nees

Trees or shrubs; flowers small, paniculate; perianth segments 6, equal; perfect stamens 9, the anthers 4-celled.—Other species occur in Central America.

Phoebe Brenesii Standl., sp. nov.—Arbor 5–6-metralis, ramulis sat gracilibus plus minusve angulatis in statu juvenili sparse tomentulosis cito glabratis; folia inter minora longe petiolata coriacea, petiolo gracili ad 2 cm. longo glabro; lamina elliptica vel oblongo-elliptica, interdum late elliptica, 3.5–9.5 cm. longa 2–4 cm. lata vulgo abrupte breviter obtuso-acuminata, basi subacuta ad rotundata, in statu juvenili sparse tomentulosa, cito glabrata, subtus in axillis nervorum interdum breviter barbata, supra lucida costa nervisque subimpressis saepe flavescens, subtus pallidior et saepe plus minusve glaucescens paullo supra basin solemniter triplinervia, nervis lateralibus superioribus paucis distantibus irregularibus; inflorescentiae laxe paniculatae longe pedunculatae vulgo multiflorae foliis saepe longiores fere omnino glabrae, pedicellis gracilibus plerumque 3–6 mm. longis gracilibus, floribus 3 mm. longis, segmentis ellipticis obtusis, exterioribus fere glabris, interioribus sparse tomentulosis vel glabratis, basi breviter connatis; fructus ovalis ca. 8 mm. longus.—Entre San Miguel y La Palma de San Ramón, *Brenes 17048* (type in Herb. Field Mus.); Piedades near San Ramón, 1,000 meters, *Brenes 4896;* San Pedro de San Ramón, *Brenes 16943, 6675;* San Miguel de San Ramón, 900–950 meters, *Brenes 5518;* La Palma de San Ramón, *Brenes 6810.*

Phoebe costaricana Mez & Pittier, Bull. Herb. Boiss. II. 3: 230. 1903. Cañas Gordas, 1,100 meters, *Pittier 11107.* Endemic. Leaves narrowly elliptic, acuminate, glabrous; panicles glabrous, longer than the leaves.

Phoebe mexicana Meissn. *Aguacatillo.* Meseta Central to the Pacific coast, at 500–1,200 meters, in forests, hedges, and thickets, or on stream banks. Ranging to Mexico. A tree of 5–6 meters or more; leaves oblong, acuminate, 3-nerved, almost glabrous; inflorescence densely pubescent, the flowers greenish.

Phoebe mollicella Blake, Contr. Gray Herb. 52: 64. 1917. *Quizarrá, Quizarrá amarillo.* Forests of El Copey, 1,800 meters, *Tonduz 11676.* Oak (*Quercus*) forests of Cantón de Dota, and on the slopes of Irazú, 1,500–2,100 meters; region of San Ramón, at 1,050 meters. Endemic. A tree of 5–12 meters; leaves lanceolate

or oblong, small, attenuate to the apex, soft-pubescent beneath; flowers very small, green, fragrant. The species is well marked by its small, pubescent leaves. It is said to furnish good wood.

Phoebe neurophylla Mez & Pittier, Bull. Herb. Boiss. II. 3: 231. 1903. Río Hur, Valle del Diquís, 1,100 meters, *Pittier 12054*. Endemic. A small tree; leaves narrowly elliptic, acuminate, 3-nerved, almost glabrous; inflorescence glabrous.

Phoebe Pittieri Mez, Bot. Jahrb. 30: Beibl. 67: 16. 1901. *Aguacatillo*. Forests of El Copey, 1,800 meters, *Tonduz 11893*. Regions of Dota, Cartago, and San Ramón, 1,000–1,800 meters. Endemic. A tree of 5–6 meters; leaves small, elliptic-lanceolate, acuminate, glabrous; flowers very small, pubescent, yellowish green.

Phoebe Tonduzii Mez, Bot. Jahrb. 30: Beibl. 67: 15. 1901. *Aguacatillo blanco*. Forests of El Copey, 1,800 meters, *Tonduz 11735*. Endemic. A tree; leaves elliptic, 3-nerved, acute, almost glabrous; inflorescence densely tomentose. Wood white, soft, much attacked by insects, not durable. The Térraba name is reported as Snungró.

Phoebe Valeriana Standl., sp. nov. *Quizarrá*. Species *P. betazensi* Mez peraffinis, foliis latioribus late oblongis usque ad late obovatis basi acutis vel rotundatis, subtus pilis brevioribus densius indutis.—Costa Rica: El Copey, *Tonduz 11746* (type in herb. Field Mus.). Common in the regions of Dota and El Muñeco, Prov. Cartago, 1,400–1,800 meters; region of San Ramón. Endemic. A medium-sized tree, the leaves oblong to broadly obovate, as much as 25 cm. long and 12 cm. wide, obtuse or short-acuminate at the apex, acute to rounded at the base, somewhat pubescent on the upper surface, densely pilose beneath with short and very dense hairs; flowers small, glabrous. The Costa Rican species has been referred to *P. betazensis* Mez, of Guatemala, which differs in having much narrower leaves, and a pubescence composed of much longer and denser hairs.

HERNANDIACEAE

Trees or shrubs, the leaves alternate, simple, petiolate, without stipules; flowers perfect or monoecious, regular, small, in axillary cymes or panicles; perianth 3–10-parted; petals none; stamens as many as the perianth segments, the anthers 2-celled; ovary inferior, 1-celled; ovule 1.—There are probably to be found in Costa Rica species of the only other Central American genus, *Sparattanthelium*.

GYROCARPUS Jacq.

The genus consists of a single species.

Gyrocarpus americanus Jacq. Dry forests of the Pacific slope. Widely distributed in the tropics of almost the whole earth. A tall or medium-sized tree with smooth, gray bark; leaves long-petiolate, large, lobate or sometimes entire, the lobes entire, acuminate; flowers small, greenish, unisexual, cymose; fruit nut-like, 2 of the perianth segments persistent and in fruit 10–12 cm. long, spatulate, the nut ellipsoid, 2 cm. long, densely pubescent. When the fruits are detached from the tree, they fall toward the ground, spinning like a parachute. The wood is soft, white, and light in weight. In some regions it is utilized for making toys and boxes. In other parts of Central America the name Volador is given to the tree. Oersted has noted for Costa Rica the name Papaya cimarrona, a name whose application to this tree does not seem very probable.

HERNANDIA L.

Trees, the leaves large, entire, long-petiolate; flowers monoecious, involucrate; fruits enclosed in a fleshy, accrescent involucel.—From Central America only two species are known.

Hernandia didymantha Donn. Smith, Bot. Gaz. 31: 120. 1901. Punta Mona, *Pittier 12682*. Forests of the Atlantic coast. Endemic. A tree of 5–15 meters; leaves oblong, 12–18 cm. long, acuminate, rounded or obtuse at the base, glabrous; panicles longer than the leaves; sepals 5 mm. long.

Hernandia sonora L. *Aguacatillo*. *H. guianensis* Aubl. Forests of the Atlantic tierra caliente. Mexico to the Guianas. A medium-sized tree, the leaves ovate or rounded-ovate, short-acuminate; flowers white, the sepals tomentulose. The wood is soft, easily worked, and light in weight.

PAPAVERACEAE. Poppy Family

Reference: Fedde, Papaveraceae, Pflanzenreich IV. 104. 1909.

Herbs, shrubs, or small trees, usually with yellow or red sap; leaves alternate, entire or lobate, without stipules; inflorescence commonly terminal, the flowers perfect, regular; sepals 2 or 3, free, caducous; petals 4–6, rarely none; stamens usually numerous; ovary free, of 2–20 united carpels, the ovules numerous or only 1; fruit capsular.—All the Central American genera are represented in Costa Rica.

ARGEMONE L.

A single species occurs in Central America.

Argemone mexicana L. *Cardosanto.* Meseta Central to the coasts, in waste ground or sandy stream beds. A species almost pantropic in distribution. A very spiny herb a meter high or less with yellow sap, the leaves green or whitish, pinnatifid; flowers yellow, the petals 2–3 cm. long; capsule spiny. An abundant plant in many localities. A form with white petals that is very common is *A. mexicana* var. *ochroleuca* (Sweet) Lindl. The latex has narcotic and purgative properties, and although its use is somewhat dangerous, it is employed commonly in domestic medicine.

BOCCONIA L.

From Central America three other species are known, growing in Guatemala.

Bocconia frutescens L. *Guacamayo, Tabaquillo.* Common in forests of the central region, at 600–2,000 meters, sometimes in abandoned fields. Mexico to Peru. A shrub or small, sparsely branched tree 2–5 meters high, the sap orange; leaves petiolate, very large, pinnatifid, the segments entire or dentate, the blades green or whitish beneath, glabrous or somewhat tomentose; flowers 1 cm. long, in large panicles, without petals; capsule 1-seeded. The bitter, acrid sap, of unpleasant odor, contains an alkaloid, protopine. The shrub is a rather ornamental one because of its distinctive foliage.

ESCHSCHOLTZIA Cham. California poppy

Eschscholtzia californica Cham. Native of California, conspicuous because of its handsome, yellow flowers, cultivated in many Central American gardens. The flowers close at night, and on this account the plant is usually known by the name Adormidera.

PAPAVER L. Poppy

Papaver somniferum L. *Tulipán, Amapola.* An ornamental garden plant, native of China. Its sap supplies the narcotic drug opium.

CRUCIFERAE. Mustard Family

Herbs, the leaves alternate, simple or compound, without stipules; flowers small or rather large, in racemes or corymbs; sepals 4, usually deciduous; petals 4, commonly unguiculate; stamens generally 6, unequal; ovary superior, 2-celled, the style commonly per-

sistent, the stigma discoid or bilobate; fruit a silique, with 2 cells, almost always dehiscent.—The genera *Descurainia* and *Draba* have representatives in Guatemala. Although lavishly represented in temperate regions, the Cruciferae have but few species in Central America.

BRASSICA L.

Annuals or biennials, glabrous or with pubescene of simple hairs; flowers usually yellow; silique linear or oblong.—There are no native species of the genus in America.

Brassica campestris L. *Mostaza, Mostacilla.* Common in coffee plantations or other cultivated ground, and in waste places, Meseta Central and probably in other regions. Native of the Mediterranean Region, but cultivated in other parts of the world for its edible leaves, this mustard is naturalized in many places. Easily recognized in the genus by its sessile cauline leaves, cordate at the base.

Brassica juncea (L.) Coss. *Mostaza.* Common in cornfields and coffee plantations of the central region. Imported from Europe and Asia. Leaves acute at the base, the lower ones pinnatisect, those of the branches entire or dentate.

Brassica oleracea L. *Repollo.* Cabbage is cultivated commonly, chiefly in the temperate and colder regions; of European origin.

Brassica oleracea L. var. **botrytis** L. *Coliflor.* Cauliflower is grown commonly in the temperate regions.

Brassica Rapa L. *Nabo.* Turnips are cultivated in many parts of the country. A plant of European origin.

On seashores there probably occurs *Cakile lanceolata* (Willd.) O. E. Schulz, a glabrous, fleshy herb with indehiscent fruits, but I have seen no Costa Rican specimens.

CAPSELLA Medic. Shepherd's-purse

Capsella Bursa-pastoris (L.) Medic. Common in cultivated or waste places of the Meseta Central. Introduced from Europe and now naturalized in almost all temperate regions of America. An annual with long racemes of small, white flowers; easy to recognize by its triangular, compressed siliques.

CARDAMINE L.

Reference: O. E. Schulz, Monographie der Gattung *Cardamine*, Bot. Jahrb. 32: 289. 1903.

Low perennials or annuals, the leaves usually pinnate; flowers white, pink, or purple; silique compressed, narrow and elongate.—A large genus, with two other Central American species in Guatemala.

Cardamine Bradei O. E. Schulz, Notizbl. Bot. Gart. Berlin 8: 328. 1923. Volcán de Barba, *A. C. Brade 2305*. Also on La Carpintera, at 1,800 meters, and in Santa María de Dota; region of San Ramón, 1,000–1,250 meters. Endemic. Leaflets 3, about 4–5 cm. long, obtuse or acute; siliques 4 cm. long.

Cardamine flaccida Cham. & Schlecht. Volcán de Turrialba, 2,500 meters. Mexico to Argentina and Chile. Leaflets 5–12 or more, only 1 cm. long, entire or nearly so, glabrous; siliques 1–2 cm. long.

Cardamine ovata Benth. Common in forests of the central mountains, ascending to 3,000 meters. Ranging to Venezuela and Ecuador. Leaflets usually 5, ovate, 2–5 cm. long, somewhat pubescent or almost glabrous; siliques 4–5 cm. long.

LEPIDIUM L. Peppergrass

Reference: Thellung, Die Gattung *Lepidium* (L.) R. Br. 1906.

Two additional species occur in other parts of Central America.

Lepidium costaricense Thell. Bull. Herb. Boiss. II. 4: 713. 1904. San Juan, Irazú, *Hoffmann 139*. Common in cultivated and waste ground of the Meseta Central, ascending to 2,200 meters or more. Reported also from Guatemala. An annual, the leaves pinnatifid, with narrow segments; flowers very small, white, in dense, elongate racemes; siliques rounded, flat, emarginate, 3–4 mm. long. The leaves have a pungent and characteristic flavor. Other species of the genus are employed in some parts of the world as salad plants. The Costa Rican plant has been referred to *L. incisum* Roth, *L. ruderale* L., *L. Humboldtii* DC., and *L. bipinnatifidum* Desv. It is closely related to *L. virginicum* L. of North America, and perhaps not distinct. Although known only from Central America, it does not behave as a native plant, and it seems more likely that it has been introduced from some other region.

LOBULARIA Desv.

Lobularia maritima (L.) Desv. Sweet alyssum is cultivated commonly in gardens as an ornamental plant. Native of Europe. An annual with small, white, very fragrant flowers in long racemes. In Salvador it is known by the name No-me-olvides.

NASTURTIUM R. Br.

Annuals or perennials, the leaves usually pinnate or pinnatifid; flowers small, white or yellow, racemose; siliques short, terete, sessile. —Two other species are known from Central America.

Nasturtium indicum (L.) DC. Naturalized in grassy places about San José. Native of Asia and Africa. Leaves ovate or oblong, sinuate and sometimes lobate near the base; flowers without petals; siliques 2–3 cm. long. Unknown in other parts of Central America.

Nasturtium mexicanum Moc. & Sessé. *Platanillo. N. plebejum* Polak. Linnaea 41: 546. 1877 (near San José, *Polakowsky 534*). Common in grassy places of the Meseta Central, ascending to the meadows of the volcanoes, 1,000–2,400 meters. Mexico to Colombia. Leaves pinnate or pinnatifid; flowers yellowish; siliques 1–1.5 cm. long.

Nasturtium officinale R. Br. *Berros. Radicula Nasturtium-aquaticum* Britt. & Rendle. An aquatic plant, common in small streams of the temperate region, sometimes growing in boggy meadows. Native of Europe and Asia but long ago naturalized in many parts of America. Watercress is one of the favorite salad plants in most parts of Central America.

RAPHANUS L. Radish

Raphanus sativus L. *Rábano.* Cultivated commonly almost everywhere. Native of Europe. There are numerous forms, distinguished by the shape and color of the roots. The plant sometimes grows as a weed in coffee plantations.

SISYMBRIUM L.

Another species of this large genus is native in Guatemala.

Sisymbrium costaricense Standl. Journ. Wash. Acad. Sci. 17: 251. 1927. Moist thickets near El Copey, Prov. San José, 2,000 meters, *Standley 42548*. Also in Chiriquí, Panama. A glabrous

annual about a meter high, the leaves sessile, cordate at the base, almost entire; flowers small, whitish, in long racemes; siliques linear, 3 cm. long. The plant has been referred to *S. turritoides* Loes. and *S. Galeottianum* Fourn., Mexican species.

TOVARIACEAE

The family consists of a single genus with two species, the other in Peru.

TOVARIA Ruiz & Pavón

Tovaria diffusa (Macfad.) Fawc. & Rendle. Santiago and Naranjo, 1,100–1,650 meters, and doubtless in other localities; region of San Ramón; a plant of wet forest. Mexico, Jamaica, and western South America. An herb, erect or somewhat scandent, as much as 5 meters long; leaves alternate, palmately compound, the 3 leaflets lanceolate, 6–15 cm. long, acuminate, entire; flowers greenish white, in elongate racemes; sepals 8; petals 8; fruit a globose berry 1 cm. long. The Central American plant has been referred incorrectly to *T. pendula* Ruiz & Pavón.

CAPPARIDACEAE. Caper Family

Herbs, shrubs, or trees; leaves alternate, with or without stipules, simple or palmately compound, the blades or segments generally entire; flowers usually perfect, small or large, axillary and solitary or in terminal racemes or corymbs; sepals 4–8, free or united; petals 4, sessile or unguiculate; stamens few or numerous; ovary sessile or terminating an elongate gynophore, 1–8-celled; stigma short or none; fruit capsular or baccate.—Other genera represented in Central America are *Steriphoma* and *Polanisia*.

CAPPARIS L.

Shrubs or trees; leaves simple, mostly coriaceous; flowers pedicellate, in racemes or corymbs; calyx 4-lobate or 4-parted, or the sepals free; stamens 6 or numerous; ovary 1–4-celled, the gynophore short or elongate; fruit a short or elongate berry.—A large genus of the tropics, represented in Central America by about 15 species. *Capparis spinosa* L. of the Mediterranean region furnishes the capers (*alcaparras*) of commerce, which are the flower buds and young fruits pickled with vinegar and salt.

Capparis Baducca L. Dry thickets, Guanacaste; San Mateo. Mexico to northern South America, and in the West Indies. A shrub of 3 meters, glabrous; leaves oblong-elliptic or ovate, obtuse

or acuminate; sepals imbricate; berry short-stipitate, oblong, 3–5 cm. long.

Capparis discolor Donn. Smith, Bot. Gaz. 24: 389. 1897. Rodeo de Pacaca, *Pittier 3537*. Endemic. A small, glabrous shrub or tree; leaves linear-oblong, acute; sepals imbricate; petals 2 cm. long, not clawed; stamens numerous, longer than the petals.

Capparis filipes Donn. Smith, Bot. Gaz. 23: 2. 1897. Suerre, Plains of Santa Clara, 270 meters, *J. D. Smith 6433*. Forests of the Atlantic coast, extending to Guanacaste. Endemic. A shrub 1.5–3 meters high, the pubescence of stellate hairs; leaves very shortly petiolate, elliptic-oblong or obovate-oblong, short-acuminate, pubescent; sepals open in bud, acute.

Capparis Heydeana Donn. Smith. Río Zhorquín. Also in Guatemala. A small, glabrous tree; leaves elliptic-oblong or obovate-oblong, acuminate; pedicels elongate; sepals rounded at the apex; stamens 6; berry long-stipitate, oblong.

Capparis indica (L.) Fawc. & Rendle. *C. Tonduzii* Briq. Ann. Cons. Jard. Genève 17: 391. 1914 (Nicoya, *Tonduz 13970*). Thickets and dry forests of the Pacific coast. Mexico to Venezuela and West Indies. A shrub or small tree, the indument of minute scales; leaves linear to obovate, acute or obtuse; sepals open before anthesis; stipe elongate, the fruit as much as 30 cm. long, slender.

Capparis isthmensis Eichl. Thickets and dry forests of the Pacific coast, common in Guanacaste; region of San Ramón. Also in Panama. A shrub of 3–4.5 meters; leaves short-petiolate, elliptic-oblong, acute, covered beneath with brown scales; sepals valvate, acute; stamens numerous; fruit linear, terete, pink, as much as 30 cm. long.

Capparis Lankesteri Standl. Journ. Wash. Acad. Sci. 15: 475. 1925. Near the coast, Río Reventazón, *Lankester 697*. Known only from the original collection. A small tree, glabrous; leaves rounded-ovate, 30 cm. long, acuminate; sepals imbricate; pedicels 8–9 cm. long; stamens numerous; flowers pink.

Capparis odoratissima Jacq. Thickets of the Pacific coast. Mexico to Venezuela. A shrub or small tree, sometimes 8 meters high; leaves elliptic, obtuse or rounded at the apex, covered on the lower surface with small scales; sepals valvate; stamens numerous; fruit torulose, as much as 15 cm. long.

Capparis Pittieri Standl. Journ. Wash. Acad. Sci. 17: 253. 1927. Río Hondo, 50 meters, *Pittier 16648*. Leaves almost sessile, oblong, short-acute, tomentulose with stellate hairs beneath; sepals obtuse, open before anthesis; ovary glabrous. Known only from the original collection.

Capparis pseudocacao Schum. ex Wercklé, Subreg. Fitogeogr. Costarr. 19. 1909. No description has been published of this species, which is known only through a statement by Wercklé: In the forests of this region is found the *granadilla de árbol, Capparis pseudocacao* K. Schum., a small tree with the appearance of *laurel*, and bunches of handsome, white, fragrant flowers; its fruits resemble in shape and size, and even in their long stalk, those of the *granadillas* (*Passiflora*), and they are edible; it is called also *cacao de mico*, but it has this name in common with a *Theobroma* and various Pachiras; it grows at Monte Redondo.

Capparis verrucosa Jacq. *C. brevipes* Benth. Bot. Voy. Sulph. 65. 1844 (Golfo de Nicoya, *Sinclair*). Pacific coast. Mexico to Venezuela. A shrub or small tree, somewhat pubescent; leaves nearly sessile, oblong, obtuse or acute, almost glabrous; flowers white, the sepals rounded, imbricate; stamens numerous, longer than the petals; fruit stipitate, oblong, 2.5–6 cm. long.

CLEOME L.

Small or large herbs; leaves long-petiolate, palmate, with 3–9 entire leaflets; flowers racemose, white or purplish; stamens 4 or 6, free; fruit an elongate, stipitate capsule, containing numerous seeds. —In Central America there are known about 10 species of the genus.

Cleome gigantea L. Shirores, Talamanca. Ranging to Brazil. An herb as much as 2 meters high, pubescent and glandular; leaflets usually 7, pubescent; petals green, 2.5–5 cm. long; racemes not bracteate.

Cleome longipes Lamb. Thickets of the Atlantic coast. Ranging to Peru. Plants large and scandent, armed with short spines; leaflets 3, sometimes 5, almost glabrous; racemes elongate, pendent; capsules very slender, 10–15 cm. long, the gynophore as much as 30 cm. long. The only scandent species of Central America.

Cleome pilosa Benth. *C. pilosa* var. *costaricensis* Donn. Smith, Bot. Gaz. 23: 235. 1897 (Cartago, *Cooper 5709*). *C. Pittieri* Briq. Ann. Cons. Jard. Genève 17: 370. 1914 (Cerros de Ochomogo, 1,600

meters, *Pittier 13024*). Common in the central region, also in the Atlantic coast. Mexico to Venezuela. An unarmed plant, pubescent and glandular; leaflets 5; petals greenish or purplish, less than 1 cm. long; capsules 5–8 cm. long; gynophore shorter than the pedicel.

Cleome pubescens Sims. Guápiles, a weed in a garden. Ranging to Brazil. Plants unarmed, pubescent and glandular; leaflets 5–7; racemes bracteate, the petals white, less than 1 cm. long; capsules 5–8 cm. long, the gynophore longer than the pedicel.

Cleome serrata Jacq. Tierra caliente of the Atlantic slope, often growing in banana plantations. A species of wide distribution. Plants unarmed, glabrous; leaflets 3; flowers few in the racemes, white or pink; capsule 5–7 cm. long.

Cleome spinosa Jacq. *Espuela de caballero. C. Tonduzii* Briq. Ann. Cons. Jard. Genève 17: 375. 1914 (Nicoya, *Tonduz 13862*). Waste or cultivated ground, Meseta Central to the coasts. Widely distributed in America. Plants armed with short spines, pubescent and glandular; leaflets 5–7; racemes bracteate, the petals pink or white, 2 cm. long; capsule 5–12 cm. long.

CRATAEVA L.

A genus represented in Central America by a single species.

Crataeva Tapia L. *Muñeco.* Common in thickets or forests of the coasts. A species of wide distribution. A tree of 5–10 meters, glabrous, the bark grayish brown; leaves deciduous, long-petiolate, the 3 leaflets ovate or elliptic, acute, entire; flowers green or dull purple, in short, terminal racemes; petals 4, unguiculate; stamens very numerous, elongate; fruit a round berry 2–5 cm. in diameter. In Chiriquí this tree is known by the name Estrella. Some Costa Rican specimens have been referred to *C. gynandra* L. The wood is white or yellowish, not very hard, medium-grained, and not lasting. It is little utilized.

GYNANDROPSIS DC.

Plants very similar to the species of *Cleome* but recognizable by the fact that the filaments are united for some distance at the base with the gynophore. Another Central American species occurs in Panama.

Gynandropsis pulcherrima Standl. Journ. Wash. Acad. Sci. 17: 253. 1927. Near Tilarán, Guanacaste, 650 meters, *Standley & Valerio 44560.* Common in forests of the whole central region, and

in Guanacaste, 500–1,600 meters. Endemic. Plants herbaceous or slightly woody, 1–3 meters high, simple or with few branches; leaflets 3, large; petals 1.5–2 cm. long, bright red or sometimes pink; capsules 7–13 cm. long. A showy plant because of its handsome flowers.

Gynandropsis speciosa (HBK.) DC. El Arenal, Guanacaste, and doubtless in other localities. A species of wide distribution in tropical America. An annual, 1 meter or more in height; leaflets 5–9; petals 2.5–3 cm. long, pink or white; capsule 8 cm. long. Cultivated commonly in Central America as an ornamental plant, and probably not native in Costa Rica.

RESEDACEAE. Mignonette Family

RESEDA L. Mignonette

Reseda odorata L. *Reseda.* A plant of European origin, often planted in gardens for its small and inconspicuous but very fragrant flowers.

MORINGACEAE. Horseradish Tree Family

The family consists of a single genus, with three species.

MORINGA Juss.

Moringa oleifera Lam. *Marango.* Commonly planted in hedges and also as an ornamental tree, often naturalized. Native of Africa and the East Indies. A small tree with whitish bark; leaves alternate, twice or thrice pinnate, with numerous small, entire leaflets; flowers white, fragrant, in axillary panicles, with 5 petals and 5 stamens; fruit capsular, elongate and obtusely 3-angulate, dehiscent by 3 valves; seeds numerous, winged. The wood is very soft. The flavor of the roots resembles that of horseradish (*Armoracia; Rábano picante*). From the seeds is obtained ben oil, used for lubrication of delicate instruments, especially watches. Although planted in many parts of Central America, this tree is of quite ordinary appearance, its branches are easily broken, and it has little to recommend it.

CRASSULACEAE. Orpine Family

Reference: N. L. Britton & J. N. Rose, Crassulaceae, N. Amer. Flora 22: 7. 1905.

Herbs, the leaves alternate or opposite, simple or pinnate, without stipules, usually very succulent; calyx with 4 or 5 more or less united segments; petals as many as the sepals; stamens as many or

twice as many as the petals; fruit of 4–5 distinct or united carpels, the minute seeds few or numerous.—This family, with so numerous species in Mexico, has few representatives in Central America.

BRYOPHYLLUM Salisb.

Bryophyllum pinnatum (Lam.) Kurz. *Hoja del aire, Terneritos. B. calycinum* Salisb. Naturalized in almost all inhabited parts of the Meseta Central, abundant in many places, often seen in gardens as an ornamental plant. Introduced from the Old World. Plants very succulent, the leaves thick, simple or pinnate; calyx inflated, reddish, 3 cm. long; corolla brownish red. The plant possesses extraordinary vitality. Stems or single leaves removed from a plant continue to live and even grow for some time. A leaf placed upon the ground quickly produces new plants from the crenations at the margin.

ECHEVERIA DC.

Echeveria australis Rose, Bull. N. Y. Bot. Gard. 3: 6. 1903. *Siempreviva.* San José, *Pittier.* Common in the Meseta Central, growing upon roofs and walls, in the forks of trees, or in the ground; Zarcero. Endemic. Plants perennial, pale green; leaves spatulate, 3–7 cm. long, rounded at the apex; flowers pale red, in short racemes or panicles. An ornamental plant, often grown in gardens.

PODOSTEMONACEAE

Reference: Weddell in DC. Prodr. 17: 39. 1873; Nash, N. Amer. Fl. 22: 3. 1905.

Small, aquatic plants, submerged and attached to rocks in rivers, superficially resembling mosses or algae; leaves simple and entire or compound; flowers small, usually perfect, naked or enclosed in a spathe, axillary, pedicellate; perianth none or a 3–5-parted calyx; stamens 1 or more; ovary 2–3-celled; fruit capsular, 2–3-celled, costate.—An interesting group because of the unusual habitat of the plants and their general appearance, suggestive much more of mosses than phanerogams. They abound in Costa Rica in the swifter-flowing streams with rocky beds. In Guanacaste these plants are well known by the name Pasacarne, and it is stated that during the dry season they are an important source of forage for cattle, which soon learn to wade into water and thrust their heads under the surface to pull them from the rocks. Because they grow in places where ordinarily phanerogams are not expected, these plants have been neglected by most collectors and herbarium material of them usually is quite inadequate for their study.

BLANDOWIA Willd.

In North America there is only the following species.

Blandowia myriophylla (Wendl.) Nash, N. Amer. Flora 22: 5. 1905. *Pasacarne, Lana. Neolacis myriophylla* Wedd. in DC. Prodr. 17: 63. 1873. Río Virilla, *Hoffmann 271.* Common in streams of the central region, also Cantón de Dota and Guanacaste, at 1,500 meters or less. Endemic. A small plant, forming dense carpets over rocks, the leaves thrice pinnatifid, 5–10 cm. long, the segments very numerous, short, filiform, the rachis broad; pedicels 1–4 cm. long, slender; stamens 2–3; capsule 3 mm. long, bivalvate, costate.

MARATHRUM Humb. & Bonpl.

Acaulescent, glabrous perennials with thick rhizomes; leaves lobate or several times pinnate; pedicels arising between the leaves, subtended by long spathes; stamens 5–25; capsule 2-celled, 8-costate. —Other species grow in Central America, and probably also in Costa Rica.

Marathrum Schiedeanum (Cham.) Tulasne. Streams near San José, and probably in other regions. Mexico to Colombia. Leaves about 4 times pinnatifid, petiolate, 10–40 cm. long, the segments short and exceedingly numerous, the rachis thick; capsule 4–5 mm. long.

Marathrum utile Tulasne. Río del Volcán. Also in Colombia. Leaves 30 cm. long, elongate-oblong, entire or pinnatifid, with few broad segments; pedicels 1.5–6 cm. long; capsule 3–4 mm. long. The plant is very different in appearance from other Costa Rican members of the family.

TRISTICHA Thouars

The genus is represented in North America by a single species.

Tristicha hypnoides (St. Hil.) Spreng. Common in Guanacaste, and collected also near San José, 500–1,200 meters. Mexico to Brazil and West Indies. A small plant, moss-like in appearance, the stems less than 10 cm. long, densely covered with minute leaves, these ovate and obtuse, less than 2 mm. long; capsule 1 mm. long.

SAXIFRAGACEAE. Saxifrage Family

Shrubs or trees (in Central American genera), the leaves alternate or opposite, with or without stipules, simple; flowers perfect,

small or large, with 4 or 5 sepals and the same number of petals; stamens 4–5 or numerous; fruit a capsule or berry.—No other genera are known from Central America. The family is best represented in cold and temperate regions, and the Central American genera are not typical of the family as a whole.

ESCALLONIA Mutis

Trees or shrubs; leaves alternate, entire or dentate, without stipules; flowers white, the petals unguiculate; stamens 5; capsule 2–3-celled.—In Central America there are only two species of this South American group.

Escallonia floribunda HBK. Naranjo, 1,680 meters, *Stork 1821*. Colombia and Venezuela to Brazil. Unknown elsewhere in Central America. A shrub or small tree, the bark gray; leaves narrowly lance-oblong, entire, 4–9 cm. long; flowers numerous, in terminal panicles.

Escallonia poasana Donn. Smith, Bot. Gaz. 23: 243. 1897. *Cipreso*. Upper lake of Volcán de Poás, 2,220 meters, *Pittier 2971*. Paramos and forests of the colder regions, Poás, Irazú, and Cerro de Las Vueltas, at 2,100–3,000 meters. Endemic; abundant in some localities. A densely branched shrub or tree of 2–6 meters; leaves coriaceous, short-petiolate, obovate, 2–2.5 cm. long, crenulate or almost entire, glabrous; flowers solitary, terminal.

HYDRANGEA L.

Shrubs or trees; leaves opposite; flowers small or large, cymose, with 4–5 sepals and the same number of petals; stamens 8 or 10; fruit a small, 2–4-celled capsule.—Another Central American species is known from Panama.

Hydrangea diplostemona (Donn. Smith) Standl. Journ. Wash. Acad. Sci. 18: 160. 1928. *Gilibertia diplostemona* Donn. Smith, Bot. Gaz. 61: 373. 1916. *H. inornata* Standl. Journ. Wash. Acad. Sci. 17: 9. 1927. Forests of Tuis, 700 meters, *Pittier 14068*. Collected also at Santa María de Dota and in the region of San Ramón, ascending to 1,550 meters; reported from El General. Endemic. An epiphytic shrub, similar to *H. Oerstedii*, the pubescence of the branches more abundant and coarser, ferruginous; flowers all alike, small, the cymes without large sterile flowers.

Hydrangea Oerstedii Briq. Ann. Cons. Jard. Genève 20: 407. 1919. *Cornidia radiata* Oerst. Vid. Med. Kjoebenhavn 1856: 42. 1856.

Cerros de Candelaria, 1,800–2,100 meters, *Oersted 1782*. Common in forests of the central mountains, 1,800–3,000 meters; also in Guanacaste; region of San Ramón, at 1,200–1,300 meters. Panama. A scandent shrub, climbing over tall trees, or sometimes an erect shrub or tree, the pubescence scant, of stellate hairs; leaves petiolate, elliptic or oblong, almost entire; inflorescence at first enclosed in large, thin bracts, the fertile flowers small, the outer flowers of the large cyme sterile and large, pink. One of the most beautiful plants of Costa Rica because of its broad cymes of showy flowers, which are not inferior in beauty to those of cultivated species. The young plants of this species, which are small epiphytes with small, dentate leaves, abound almost everywhere in the temperate region, growing on tree trunks and fence posts, but they are so very unlike adult plants that no one would suspect the relationship. It was only after long effort that I was able to associate the two forms. This has been reported as *Hydrangea peruviana* Moric. and *Cornidia peruviana* Small.

Hydrangea opuloides Koch. *Hortensia*. An ornamental shrub, cultivated commonly in gardens. Native of China and Japan. Flowers blue or white.

PHILADELPHUS L.

No other species is known from Central America, unless in cultivation.

Philadelphus myrtoides Bertol. *Mosqueta, Mosqueta trepadora. P. trichopetalus* Koern. Cultivated commonly for ornament; Pittier states that it is native, but this is probably not the case. Perhaps native in Guatemala. A shrub of 2–5 meters; leaves opposite, ovate, denticulate; flowers large, the petals 2 cm. long; stamens numerous. A handsome shrub because of its large, fragrant, white flowers, often planted to form hedges about gardens.

PHYLLONOMA Willd.

Shrubs or small trees; leaves alternate, acuminate; inflorescence cymose, arising from the costa on the upper side of the leaf blade, near the apex; sepals and petals 5, small; stamens 5; fruit a small berry.—The genus is easy to recognize because of its extraordinary inflorescence, arising from the costa of the leaf. No other species are known from Central America, and in this general region the genus is known only from Costa Rica, although it probably occurs

in the mountains of Panama. One species grows in Mexico, the others being Andean.

Phyllonoma ruscifolia Willd. Wet forests south of Cartago, 1,300–1,600 meters; reported from El General. Also in Colombia. A slender tree of 4–8 meters; leaves lance-oblong, narrowly acuminate, entire, coriaceous; flowers green or yellowish; berries white.

Phyllonoma tenuidens Pittier, Contr. U. S. Nat. Herb. 12: 172. 1909. Cuesta de Los Borucas, road between San Marcos de Dota and Valle de Diquís, 2,900 meters, *Pittier 10552*. Also at San Cristóbal de Candelaria. Endemic. A shrub of 2–3 meters; leaves glabrous, not coriaceous, serrate with narrow, acute teeth, almost rounded at the base.

Phyllonoma triflora Pittier, Contr. U. S. Nat. Herb. 12: 173. 1909. La Palma, 1,500 meters, *Pittier 16553*. Also Cerros de Las Caricias, 2,000–2,400 meters. Endemic. A slender shrub or tree of 2–6 meters; leaves coriaceous, distantly serrate, acute at the base; berries white.

RIBES L.

To this genus belong the cultivated currants (*grosellas*) and the gooseberry (*uva espín*), plants unknown in Central America, although cultivated commonly in temperate regions of Europe and North America. A single species is native in Central America.

Ribes ciliatum Humb. & Bonpl. Paramos of Cerros de La Muerte, Buena Vista, and Las Vueltas, 3,000 meters. Also in Mexico. An unarmed shrub of 1–3 meters; leaves rounded, palmate-nerved, 2 cm. long, long-petiolate, shallowly lobate, almost glabrous; flowers small, green, in pendent racemes; berries globose, glabrous, 8 mm. in diameter.

BRUNELLIACEAE

BRUNELLIA Ruiz & Pavón

A single species is known from Central America.

Brunellia costaricensis Standl. Journ. Wash. Acad. Sci. 17: 165. 1927. Yerba Buena, northeast of San Isidro de Heredia, 2,000 meters, *Standley & Valerio 49900*. Forests of the slopes of the central volcanoes, 1,400–2,000 meters; region of San Ramón; also in the Atlantic plains, at 100 meters. Endemic. A medium-sized tree with rounded crown, sometimes 20 meters high; leaves large, axillary, the very numerous flowers small; calyx 5-lobate; corolla none; stamens 10; fruit of 4–5 dehiscent, 1–2-seeded carpels.

CUNONIACEAE

A single genus of the family is represented in Central America.

WEINMANNIA L.

Trees or shrubs; leaves opposite, simple or pinnate, without stipules; flowers small, usually perfect, with 5 sepals and 5 petals, in terminal or axillary racemes; stamens 8 or 10; ovary superior; with 2 cells and numerous ovules; fruit a small, 2-celled, 2-valvate capsule.—The majority of the species are South American. No others are known from Central America.

Weinmannia burseraefolia Standl. Journ. Wash. Acad. Sci. 17: 310. 1927. Yerba Buena, northeast of San Isidro de Heredia, 2,000 meters, *Standley & Valerio 49848*. Known only from the type. A tree; rachis of the leaf winged, the 9 leaflets elliptic, 2–3.5 cm. long, acuminate, serrate with small, acute teeth, glabrous.

Weinmannia pinnata L. *Loro, Lorito. W. intermedia* var. *Pittieri* Pampanini, Annali di Bot. 2: 74. 1904 (type from Costa Rica); *W. polyphylla* var. *macrocarpa* Pampanini, op. cit. 84. 1904 (type from Costa Rica). Wet forests of the colder regions, also in places of less elevation, at 1,200–3,000 meters, most abundant in the cold zone. Mexico to Brazil. A tree of 3–6 meters, or sometimes a shrub; rachis of the leaf winged, the 9–17 leaflets 8–20 mm. long, crenate with rounded teeth, pubescent or almost glabrous; sepals only 1 mm. long. One of the most common and characteristic trees of the upper slopes of the central volcanoes.

Weinmannia Wercklei Standl. Journ. Wash. Acad. Sci. 17: 309. 1927. *Arrayán. W. Tonduzii* Engler in Engl. & Prantl, Nat. Pflanzenfam. ed. 2. 18a: 252. 1930 (La Palma, 1,450 meters, *Biolley & Tonduz 12513*). San Cristóbal de Candelaria, Prov. Cartago, 1,700 meters, *Wercklé 3685*. Common in forests of the central region, 1,400–2,200 meters; region of San Ramón, 1,100–1,250 meters. Endemic. Usually a shrub or small tree but sometimes (according to Wercklé) a large tree; leaves simple, short-petiolate, ovate-oblong, 3.5–5.5 cm. long, acute, serrate, almost glabrous.

ROSACEAE. Rose Family

Reference: Rydberg, Rosaceae, N. Amer. Flora 22: 239–533. 1908–1918.

Herbs, shrubs, or trees; leaves usually alternate, simple or compound, with stipules; flowers generally regular and perfect; calyx

free or adherent to the ovary, commonly with 5 segments; petals as many as the sepals, equal or unequal, deciduous; stamens almost always numerous; fruit very variable as to form.—The genera *Prunus, Licania,* and *Chrysobalanus* are referred sometimes to a separate family, Amygdalaceae, but the majority of botanists place them in the Rosaceae.

ACAENA Mutis

Plants perennial, herbaceous or somewhat woody; leaves pinnate; flowers small, in spikes or racemes; calyx or hypanthium covered with hooked spines; corolla none; stamens 3–5; fruit a small achene.—No other species are known from Central America.

Acaena cylindrostachya Ruiz & Pavón. Paramos of the mountains of Dota, 3,000 meters. Known in Central America only from this region. Ranging to Peru. Leaves clustered at the base of the simple, naked stems; leaflets numerous, oblong, serrate, green above, densely covered beneath with silky, white hairs. A characteristic species of the paramos.

Acaena elongata L. Meadows and paramos of the high mountains, 2,400–3,300 meters. Mexico to Colombia. A shrub 1 meter high or less; leaflets 9–19, elliptic, 8–15 mm. long, serrate, almost glabrous. A common plant of upland pastures, a pest because of the bur-like fruits that attach themselves tightly to clothing.

ALCHEMILLA L.

Reference: Lily M. Perry, A tentative revision of *Alchemilla* section *Lachemilla,* Contr. Gray Herb. 84. 1929.

Perennial herbs; stipules united with the petioles or forming a sheath; leaves simple and palmate-lobate or parted or pinnate; flowers small, green or yellowish, in cymes or fasciculate in the leaf axils; calyx campanulate or urceolate, with 4 sepals; petals none; pistils 1–8, the fruit of small achenes.—Other species are known from Central America.

Alchemilla aphanoides L. f. var. **subalpestris** (Rose) Perry. Region of El Copey, 2,100–2,400 meters, in meadows. Mexico to Costa Rica. The species extends to Bolivia. Leaves 3-parted; calyx glabrous. The species of this genus are, for the most part, much alike, and it is possible to separate them only by small details of the leaves and flowers. It is said that this plant, like other species, furnishes good pasture for cattle.

Alchemilla ocreata Donn. Smith, Bot. Gaz. 23: 7. 1897. *Lachemilla ocreata* Rydb. N. Amer. Fl. 22: 385. 1906. El General, 600 meters, *Pittier 3431*. Also in the paramos of Cerro de Buena Vista, 3,100 meters. Endemic. Distinguished from other Costa Rican species by the cauline leaves, which are reduced to lobate sheaths. It is probable that this species is really a paramo plant and that there is some error in the elevation cited for the type specimen.

Alchemilla pascuorum Standl. Journ. Wash. Acad. Sci. 17: 310. 1927. *Mochililla*. Pasture near Las Nubes, Prov. San José, 1,800 meters, *Standley 38455*. Meadows of the central volcanoes, 1,500–2,400 meters. Endemic. Plant procumbent, the leaves 5–7-parted; flowers pilose.

Alchemilla pectinata HBK. Meadows of Volcán de Turrialba and Cerro de Las Vueltas, 2,000–3,000 meters. Mexico to Bolivia. Leaves 9–11-lobate; flowers sericeous. Reported from Costa Rica under the names *A. orbiculata* Ruiz & Pavón and *Lachemilla orbiculata* Rydb.

Alchemilla procumbens Rose. *Lachemilla costaricensis* Dammer, Repert. Sp. Nov. 15: 362. 1918 (Volcán de Irazú, 3,000 meters, *Tonduz 4269*). Meadows of Volcán de Irazú, 2,500–3,300 meters. Also in Mexico with varieties in South America. Leaves 3-parted; flowers sericeous.

Alchemilla sibbaldiifolia HBK. var. **Tonduzii** (Dammer) Perry, Contr. Gray Herb. 84: 34. 1929. *Lachemilla Tonduzii* Dammer, Repert. Sp. Nov. 15: 362. 1918. Near the summit of Volcán de Irazú, 3,000 meters, *Tonduz 4268*. Abundant in meadows of the central region, 1,500–3,000 meters. Ranging to Mexico. Leaves 3-parted; flowers pubescent.

Alchemilla Standleyi Perry, Contr. Gray Herb. 84: 29. 1929. Cerro de Las Vueltas, 2,700–3,000 meters, *Standley & Valerio 43893*. Mountains of Dota, 1,800–3,100 meters. Endemic. Leaves 3-parted; flowers pubescent. Specimens of this species have been referred to *A. tripartita* Ruiz & Pavón.

CHRYSOBALANUS L. Coco plum

A single species is found in Central America.

Chrysobalanus Icaco L. *Icaco*. Common along beaches of both coasts; Cocos Island. Generally distributed on tropical coasts of America and Africa. A shrub or tree of 1–6 meters; bark brown-

ish gray; leaves elliptic or rounded, almost sessile, coriaceous, entire, glabrous; flowers small, cymose, whitish; fruit 2–4 cm. long, white, pink, purple, or almost black, the pulp white, sweet, juicy, edible. Pittier mentions two forms of this species: one with small leaves more or less oval and attenuate to the base, with a few-flowered inflorescence and pale, elongate fruits; the other with larger, rounded leaves, the fruits larger and dark pink. It is probable that these are merely accidental variants. The fruit is eaten principally by children. Its flavor is slightly astringent and not particularly attractive. The wood is hard, strong, fine-grained, and pale brown. From the leaves and fruit there may be obtained a black dye. The seeds are rich in oil, and it is said that the Caribs employed them for illuminating purposes.

COUEPIA Aubl.

Another species is found in northern Central America.

Couepia polyandra (HBK.) Rose. *Olosapo, Zapotillo. C. floccosa* Fritsch, Ann. Naturhist. Hofmus. Wien 5: 12. 1890; Pittier, Contr. U. S. Nat. Herb. 13: 445: *pl. 87, 88* (Guanacaste, *Friedrichstahl*). Guanacaste, planted and perhaps also native. Ranging to Mexico. A medium-sized tree with gray bark; leaves petiolate, oval, obtuse, glabrous above, white and tomentose beneath; petals yellowish pink; stamens 15–20; fruit a drupe 6–8 cm. long, the flesh yellow. The fruit is edible, its flesh being sweet and aromatic.

CRATAEGUS L. Hawthorn

Crataegus pubescens Steud. Reported from Costa Rica as a cultivated tree; probably imported from Mexico. I have seen no specimens of the form grown in Costa Rica, which may be some other species. Species of *Crataegus* are planted commonly in northern Central America for their edible fruits, which resemble small apples and are larger than fruits of the numerous species native in the United States. The fruits are eaten raw or more often are made into jellies or preserves. Such preparations are one of the most common desserts of Guatemala and Salvador.

CYDONIA Mill. Quince

Cydonia oblonga Mill. *Membrillo.* A shrub cultivated in some parts of the temperate region for its acid, apple-like fruits, which are used in the preparation of jellies and preserves. Native of Asia.

ERIOBOTRYA Lindl. Loquat

Eriobotrya japonica Lindl. *Níspero japonés, Níspero del Japón.* A shrub or small tree, native of Japan, cultivated in some places for its fruits. These are oval, small, yellow, and of a most agreeable, acidulous flavor.

FRAGARIA L. Strawberry

Fragaria vesca L. *Fresa.* A plant of European origin, cultivated commonly in the temperate regions for its delicious fruits. The strawberries of Cartago are celebrated in Costa Rica, and may be had at almost all times of the year. They nearly always are offered for sale to passengers on the trains stopping at Cartago.

HESPEROMELES Lindl.

A single species is known from Central America.

Hesperomeles obovata (Pittier) Standl., comb. nov. *Osteomeles obovata* Pittier, Contr. U. S. Nat. Herb. 20: 108. *f. 47.* 1918. Volcán de Irazú, 3,000 meters, *Kuntze.* Forests and thickets of the cold region, Irazú, Turrialba, and mountains of Dota, 2,400–3,100 meters. Endemic. A shrub or tree of 3–5 meters, the branchlets spinose; leaves coriaceous, obovate, 1.5–3 cm. long, rounded at the apex, serrate, almost glabrous; flowers white, in small corymbs; stamens numerous; fruit black, juicy, small. A characteristic species of the borders of the high meadows; confused by some authors with *Osteomeles pernettyoides* Dcne. and *O. heterophylla* Ruiz & Pavón.

HIRTELLA L.

Shrubs or small trees; leaves alternate, almost sessile, entire, coriaceous; flowers small, in racemes or narrow panicles; petals 5; stamens 3–8, rarely more; fruit an obovoid drupe, with a single seed. —Three species are known from Central America.

Hirtella americana L. *H. mollicoma* HBK. Region of Buenos Aires, 500 meters. British Honduras and Guatemala to the Guianas. A shrub, the leaves oblong or elliptic, densely and softly pilose beneath, acute; flowers purple, in narrow panicles, sessile or nearly so; stamens 3.

Hirtella racemosa Lamarck. *Murta* (probably an erroneous name). Thickets of the Pacific coast, extending to Guanacaste; region of San Ramón. Mexico to Brazil. A slender shrub or tree as much as 6 meters high; leaves appressed-pilose or almost gla-

brous; flowers purple, pedicellate, in racemes; stamens 5. There has been reported for this species the Térraba name of Serin-gró.

Hirtella triandra Swartz. Thickets of the Pacific coast, ascending to 700 meters. British Honduras to Brazil. A shrub or tree of 6 meters; leaves sparsely pilose beneath; flowers pedicellate, in narrow panicles, the petals pinkish white; stamens 3.

HOLODISCUS Maxim.

Another Central American species grows in the mountains of Guatemala.

Holodiscus fissus (Lindl.) Schneid. *Sericotheca fissa* Rydb. Margins of the paramos and meadows of Irazú and Cerro de Las Vueltas, 2,400–3,000 meters. Ranging to Mexico. A shrub of 3 meters; leaves oval to oblanceolate, 2–5 cm. long, serrate; flowers small, white, in dense panicles, the petals 2.5 mm. long; stamens 20; fruit of small achenes enclosed in the calyx. The plant reported from Costa Rica as *Spiraea argentea* L. f. is this species, almost certainly. The shrub is a rather ornamental one because of its abundant panicles of white flowers.

LICANIA Aubl.

Glabrous or pubescent trees; leaves short-petiolate, entire, coriaceous; flowers small, paniculate; petals 5 or none; stamens 3–10 or more; fruit small or large, fleshy, with a single seed.—Two other species are known from Central America. There is little doubt that there occurs in the Atlantic coast of Costa Rica *L. hypoleuca* Benth., whose small leaves are white-tomentose beneath.

Licania arborea Seem. *Alcornoque.* Dry forests of the Pacific tierra caliente. Mexico to Panama. A small or large tree; leaves thick-coriaceous, oblong or oval, rounded at the base and apex, white and tomentose beneath; panicles large, the small flowers yellowish; fruit 2.5 cm. long or larger. The seeds are rich in oil, which is employed in some parts of the tree's range for making candles, soap, etc. It is said that the wood is of good quality, and is used in Costa Rica for various purposes.

Licania platypus (Hemsl.) Fritsch. *Sonzapote, Sapote.* Common in forests of the Pacific tierra caliente, probably also along the Atlantic coast. Mexico to Panama. A tall tree as much as 50 meters high; leaves oblong, 15–40 cm. long, glabrous; panicles large, the very numerous flowers small; fruit 15–20 cm. long, the rind brown

or reddish, the flesh yellow, fibrous, sweet. The tree is planted in many parts of Central America for ornament and shade and for its edible fruits. Because of its handsome, large, deep green leaves, often tinged with red purple when young, and on account of its dense and symmetrical crown, it is one of the handsomest trees of the Central American region. In flavor the fruit is not altogether agreeable, and there is a popular belief that it is "unhealthy." It is said that the fruit requires a year to reach maturity. For the species there have been reported the following Indian names: Bokóm, Bokob (Bribrí); Alúute (Guatuso).

MALUS Mill. Apple

Malus sylvestris Mill. *Manzano.* Sometimes cultivated in the cold and temperate regions, but the number of trees is very small. The Central American apples are of inferior quality, probably because of failure to plant selected varieties. Indeed, it is probable that most of the trees are seedlings. Apples are imported in substantial quantities from the western United States. The tree is believed to be Asiatic in origin.

PRUNUS L.

Reference: Koehne, Bot. Jahrb. 52: 279. 1915.

Trees or shrubs; leaves serrate or entire; flowers solitary or in racemes, corymbs, or umbels; style subterminal; fruit a drupe, with a single seed.—To this genus belong the cherry (*cerezo*), plum (*ciruelo*), apricot (*albaricoque*), and almond (*almendro*) of cultivation, some of which may have been planted in the region although any of them would be great curiosities in Central America, except as the fruits are imported. Almonds (*Prunus communis* Fritsch) are imported commonly into Costa Rica from the United States or Europe. Other species of *Prunus* besides those listed here are native in Central America.

Prunus annularis Koehne, Bot. Jahrb. 52: 308. 1915. *Mariquita.* Río Segundo, 2,000 meters, *Tonduz 1714.* Region of San Ramón. Endemic. A glabrous tree 5–9 meters high; leaves petiolate, oblong to ovate, entire, acuminate, with 2 or 4 small glands on the lower surface near the base of the blade; flowers in axillary racemes, white. The Costa Rican tree has been referred to *P. sphaerocarpa* Swartz, a Jamaican species.

Prunus cornifolia Koehne, Bot. Jahrb. 52: 284. 1915. Forests of El Copey, 1,800 meters, *Tonduz 11678.* Also on the slopes of

Poás and Barba. Endemic. A small, glabrous tree; leaves oblong or narrowly ovate, without glands. Specimens of this species also have been referred to *P. sphaerocarpa* Swartz.

Prunus Persica (L.) Sieb. & Zucc. *Durazno.* Native of Asia, cultivated commonly in the cold and temperate regions, where it produces an abundance of fruit. In the United States and Europe only ripe fruits are gathered, but in Costa Rica it is rare to find a ripe peach. The green fruits are eaten either raw or cooked. If left to ripen upon the trees they probably would be destroyed by the too numerous insects or by birds. The fruits may be obtained at almost all times of the year and it is not uncommon to see both flowers and well-grown fruits upon the same tree.

It is probable that the pear (*pera; Pyrus communis* L.) is planted in some places, but it is a very rare tree in Central America.

ROSA L. Rose

No species of *Rosa* is native in Central America, although there are many species in the United States and a few reach Mexico. The cultivated roses, of European or Asiatic origin, are planted abundantly in most parts of Central America, and nowhere do they thrive better than in central Costa Rica. Many forms are seen in gardens.

Rosa multiflora Thunb. *Rosa de Castilla.* This species, with clusters of small, pale pink, double flowers, was brought from Spain probably several centuries ago, and has become perfectly naturalized almost everywhere in the Meseta Central. One of the most characteristic and lovely features of Costa Rica is the thickets and hedges of this pretty rose that border so many of the roads almost anywhere in the central uplands.

RUBUS L.

Erect or scandent shrubs, usually armed with prickles or bristles; leaves, in the Costa Rican species, palmately compound; flowers large, white or pink, in racemes or panicles; fruit of numerous small drupes, these, in the native species, united with the receptacle to form a compound fruit.—To this genus belong the blackberries (*zarzamoras*) and raspberries (*frambuesas*) of the United States and Europe, which are not grown in Central America. Other species of the genus are native in Guatemala and other parts of Central America. Most of the Costa Rican species are much alike except for

small details, and it is not possible to characterize them with only a few words of description.

Rubus adenotrichos Schlecht. *R. costaricanus* var. *longesetosus* Kuntze, Rev. Gen. 220. 1891 (type from Costa Rica). Reported for the slopes of the central volcanoes. Ranging to Mexico. Branches prickly and glandular-setose; leaflets 3 or 5.

Rubus alpinus Macfad. *Mora.* Mountain forests, at 1,800–3,000 meters. Guatemala to the Guianas and Jamaica. Branches prickly; leaflets 3, almost glabrous; flowers white or pink.

Rubus costaricanus Liebm. Vid. Medd. Kjoebenhavn 1852: 159. 1853. *Mora, Zarzamora.* Near Cartago, *Oersted.* Common in the regions of Cartago and Dota. Also in Panama. A shrub of 1–2.5 meters, the branches with small, recurved prickles and gland-tipped hairs; leaflets 3 or 5; flowers pink.

Rubus ellipticus Smith. *Mora extrangera.* Abundantly naturalized along lanes near the Río Reventado on slopes above Cartago, where it has escaped from cultivation. A shrub of 1–1.5 meters; leaflets 3; flowers white; fruit yellow, the drupes coherent and free from the receptacle. Native of India, cultivated for it well-flavored fruits.

Rubus floribundus HBK. *Mora, Zarzamora. R. abundus* Rydb. Common in forests of the central volcanoes. Mexico to Bolivia. A shrub of 1–2 meters, the branches prickly and somewhat tomentose; leaflets 5; flowers pink; fruit dark purple. The fruits of all the native species are edible, but in most species they are very acid. They are sometimes utilized for preparing jelly and preserves.

Rubus glabratus HBK. Sitio Birrís, *Pittier.* Ranging to Ecuador. Plants suffrutescent, decumbent, prickly; leaflets 1–3; flowers usually solitary, pink; fruit red, free from the receptacle.

Rubus glaucus Benth. *Mora blanca, Mora de caballo, Mora.* Common almost everywhere in forests of the central region, at 1,400–2,000 meters. Mexico to Ecuador. A shrub, almost erect or scandent, the branches glabrous and prickly; leaflets 3, white-tomentose beneath; fruit purple-red. The fruits are outstanding in their delicious flavor, which is quite equal if not superior to that of the best raspberries of the north. They are highly esteemed in the regions where they grow, and are vastly better in flavor than the fruits of any of the other Central American species.

Rubus irasuensis Liebm. Vid. Medd. Kjoebenhavn 1852: 160. 1853. *Mora.* Volcán de Irazú, *Oersted.* Forests of the central region. Ranging to Guatemala. Branches prickly and glandular-setose; leaflets 3 or 5; flowers pink.

Rubus miser Liebm. Vid. Medd. Kjoebenhavn 1852: 156. 1853. *Mora.* Near Cartago, 1,800 meters, *Oersted.* Common in forests of the central region. Extending to Guatemala. A prickly shrub; leaflets 3; fruits almost black, very acid.

Rubus Pittieri Rydb. N. Amer. Fl. 22: 454. 1913. El Abejonal, *Pittier 2281.* Known only from the region of the type. Leaflets 3 or 5, densely pilose beneath; fruit purple.

Rubus trichomallus Schlecht. *Mora.* Common in forests of the central region; region of San Ramón. Mexico to Colombia. An erect or scandent shrub as much as 3 meters long; leaflets 3 or 5; fruit almost black. The fruit is of good quality and is much used for making refreshing beverages, jam, etc. This species is easy of recognition because of the fact that the branches are densely covered with long, glandless hairs.

Rubus vulcanicola (Donn. Smith) Rydb. N. Amer. Fl. 22: 455. 1913. *R. guianensis* var. *vulcanicola* Donn. Sm. Bot. Gaz. 23: 243. 1897. Rancho del Achiote, Volcán Poás, 2,040 meters, *Pittier 806.* Slopes of Poás and Barba, 1,800–2,100 meters; region of San Ramón. Endemic. Leaflets usually 5, pubescent beneath; flowers pink; fruit black.

SPIRAEA L.

Spiraea cantoniensis var. **lanceata** Zabel. *Buquet de novia.* A shrub with clusters of small, double, white flowers, cultivated commonly in Central American gardens. Native of China.

CONNARACEAE

Reference: N. L. Britton, N. Amer. Flora 22: 233. 1908.

Woody vines; leaves alternate, pinnate, without stipules, the leaflets entire; flowers small, usually perfect, regular, racemose or paniculate; calyx 5-lobate or 5-parted, persistent; petals commonly 5; stamens 10 or fewer; ovary of 5 distinct carpels; fruit of coriaceous or woody, 1-seeded follicles.—No other genera are known from Central America.

CNESTIDIUM Planch.

The genus consists of a single species.

Cnestidium rufescens Planch. Although I have seen no Costa Rican specimens, there can be no doubt that this species exists in the Atlantic tierra caliente, for it is common all along the Central American coast. A large or small vine; leaflets 5–9, oblong, densely pilose beneath; flowers in small, terminal and axillary panicles; fruit densely pilose, oblong, sessile.

CONNARUS L.

Woody vines; leaves glabrous or nearly so, with 3 or more leaflets; calyx not accrescent in fruit, the segments imbricate; stamens 10; follicles stipitate.—A genus represented in Central America by four species.

Connarus panamensis Griseb. Coastal thickets, Golfitò de Osa, *Brenes 12320*. Also in Panama. A small tree, or more often a woody vine; leaflets 3, narrowly oblong, mostly 12–19 cm. long, long-acuminate, coriaceous, glabrous or nearly so; panicles densely and finely ferruginous-tomentulose.

ROUREA Aubl.

Woody vines or sometimes erect shrubs; leaves pinnate, with 3 to numerous leaflets; flowers small, white or whitish, in small or large panicles; calyx lobes imbricate, persistent and accrescent in age; fruit sessile, glabrous or nearly so.—At least three species are known from Central America.

Rourea glabra HBK. In forest between Bebedero and Paso Hondo, Guanacaste, 50 meters, *Brenes 12592*. Mexico and West Indies to Venezuela. A shrub, usually scandent, glabrous or nearly so; leaflets 3–5, oblong to ovate-elliptic, mostly 5–12 cm. long, coriaceous, acuminate; panicles somewhat pubescent, small; fruit 10–17 mm. long, the large seeds dark brown, subtended by an orange aril. The seeds are believed to be dangerously poisonous. They are utilized in some parts of Central America for poisoning noxious animals, and are reported to have been used also for criminal poisoning of human beings. Collected also on Isla de Chira, *Manuel Valerio 1487*.

Rourea suerrensis Donn. Smith, Bot. Gaz. 23: 5. 1897. Suerre, plains of Santa Clara, 300 meters, *J. D. Smith 6466*. Forests of the

Atlantic coast. Endemic. A scandent or sometimes erect shrub; leaflets 3 or 5, elliptic or oblong, 15–25 cm. long, acuminate, glabrous; panicles axillary, the flowers white, 6 mm. long; follicles sessile, oblong, somewhat curved, 13 mm. long.

KRAMERIACEAE

The family is composed of a single genus.

KRAMERIA Loefl.

One other Central America species occurs in Guatemala.

Krameria cuspidata Presl. Guanacaste, *Oersted 1936*. Ranging to southern Mexico. A small shrub, the branches tomentose; leaves alternate, oblong, acute, entire, as much as 2 cm. long, tomentulose; flowers reddish, in the axils of the upper leaves, pedunculate; sepals 4, obtuse; petals 5, unequal; stamens 4; fruit globose, indehiscent, covered with very sharp, barbate spines.

LEGUMINOSAE. Bean Family

Herbs, shrubs or trees, sometimes scandent, often armed with spines or prickles; leaves mostly alternate, compound, and stipulate; flowers very variable as to form and size, but usually more or less similar to the flower of a bean (*frijol*), the 5 (rarely fewer) petals very unlike in form, the upper one (*standard*) larger than the others, the two lateral ones (*wings*) narrower, and the 2 lowest (forming the *keel*) usually still smaller, and often united; sepals more or less united; stamens commonly 10 but sometimes 5 or 9, occasionally numerous; fruit a legume, usually more or less resembling a bean pod, but variable in form and sometimes very different.

One of the largest families of plants, well represented in Central America, especially among the trees. It is possible to divide the family into three groups, treated by some botanists as distinct families—Mimosaceae, Caesalpiniaceae, and Fabaceae. It is undisputed that these groups are closely related, and that together they form a larger group easy of recognition and well distinguished from all other plants. On this account it seems more sensible to treat them as subfamilies of one large family. The characters of these three groups are as follows:

I. *Mimoseae.* Flowers regular, the petals equal or nearly so. Petals valvate before anthesis, generally united near the base. Stamens distinct or united. Leaves bipinnate, or pinnate in *Inga* and a few species of *Pithecolobium.*

II. *Caesalpinieae.* Flowers irregular, the petals unequal, imbricate before anthesis, the upper ones within the others. Stamens usually distinct. Leaves bipinnate or pinnate, rarely simple (as in *Bauhinia*).

III. *Papilionatae.* Flowers almost always papilionaceous (similar to a bean flower). Petals imbricate, the upper ones exterior in bud. Stamens 9 or 10, usually united. Leaves never bipinnate.

I. MIMOSEAE

Reference: Britton & Rose, N. Amer. Flora 23: 1–194. 1928.

ACACIA L.

Trees or shrubs, usually armed with spines or prickles, sometimes scandent; leaves bipinnate, the leaflets generally small and numerous, the petiole nearly always furnished with a small gland; flowers small, spicate or capitate, with numerous free stamens; fruit very variable in form.—In Central America there are numerous other species of this genus, one of the largest of the whole plant kingdom.

Acacia acanthophylla (Britt. & Rose) Standl., comb. nov. *Senegalia acanthophylla* Britt. & Rose, N. Amer. Fl. 23: 118. 1928. La Florida, *Pittier 11278*. Ranging to southern Mexico. A large, scandent shrub, armed with recurved prickles; pinnae 8–17-jugate, the numerous leaflets 8–10 mm. long, 2 mm. wide, acute; flowers in short, paniculate spikes; legume flat, 15–20 cm. long, 3 cm. wide.

Acacia Baileyana F. Muell. Cultivated for ornament about San José. Native of Australia. A shrub or small tree, easily recognized by its glaucous, very pale foliage; pinnae only 2–3 pairs; flowers bright yellow, in small, racemose heads.

Acacia costaricensis Schenck, Repert. Sp. Nov. 12: 361. 1913. *Myrmecodendron costaricense* Britt. & Rose, N. Amer. Fl. 23: 93. 1928. *Cornezuelo.* Lagarto, Valle del Diquís, *Tonduz 4810*. Thickets of the Pacific coast. Panama to Mexico. A shrub or small tree of 2–6 meters; spines very large, inflated and hollow, as much as 4 cm. long; pinnae 4–8-jugate, the leaflets numerous, linear-oblong; flowers yellow, fragrant, in slender spikes; fruit somewhat compressed, 4–6 cm. long, terminated by a stout, sharp beak. The spines somewhat resemble the horns of a bull. Within them are colonies of ants which exist in part upon nectar glands or bodies borne upon the young leaves. These ants are very ferocious and inflict painful bites. A separate colony, it is said, is housed in each spine, which

is entered by a hole punctured for the purpose near the apex of the spine.

Acacia dealbata Link. Cultivated for ornament in parks and elsewhere about San José. Native of Australia. A finely pubescent, pale green shrub with very numerous small, globose heads of yellow flowers; leaves with very numerous small, narrow leaflets.

Acacia Farnesiana (L.) Willd. *Aromo. Vachellia Farnesiana* Wight & Arn. Pacific tierra caliente, and probably elsewhere, often growing about dwellings. A species of wide distribution in tropics of both hemispheres. A shrub or small tree, armed with long, slender spines; pinnae 2–6-jugate, the leaflets numerous, linear, 3–5 mm. long, obtuse; flowers bright yellow, in small, globose heads, very fragrant; pods thick, scarcely compressed, 4–7 cm. long, 1 cm. thick. The wood is hard and fine-grained and suitable for tool handles and other small articles. The trunk and branches exude a gum similar to gum arabic (which is obtained from an African species of *Acacia*). The pods are rich in tannin, and are employed in some regions for tanning skins. The plant is cultivated in the Mediterranean region for its flowers, which yield an essence employed in the preparation of perfumes. Pittier reports for the species the Térraba name of Aroma-ieron.

Acacia glomerosa Benth. Thickets of Guanacaste. Southern Mexico to Brazil. A shrub or small tree, usually armed with recurved prickles; pinnae 6–8 pairs, the leaflets 12–35 pairs, oblong or linear-oblong, obtuse, puberulent or glabrate, the costa excentric; flowers yellow, in very numerous small, paniculate heads; fruit flat, glabrous, about 15 cm. long and 3 cm. wide.

Acacia Oerstedii (Britt. & Rose) Standl., comb. nov. *Acaciella Oerstedii* Britt. & Rose, N. Amer. Fl. 23: 104. 1928. Without definite locality, *Oersted*. Endemic. An unarmed shrub, the branches pilose with long, spreading hairs; pinnae 5-jugate, the leaflets oval, 7–9 mm. long, pubescent; flowers in short racemes. Probably only a form of *A. villosa* (Swartz) Willd., a Jamaican species.

Acacia Pittieriana Standl., nom. nov. *Carboncillo. Acaciella costaricensis* Britt. & Rose, N. Amer. Fl. 23: 101. 1928. Santa María de Dota, *Standley 41877*. Thickets of the central region; San Ramón. Endemic. A small, unarmed tree, the branchlets glabrous; pinnae 10–12-jugate, the leaflets numerous, 4–5 mm. long, linear; flowers in small, paniculate heads, the stamens white; legume

flat, 3–5 cm. long, 7–9 mm. wide. Probably only a form of *A. angustissima* (Mill.) Kuntze.

Acacia spadicigera Schlecht. & Cham. *Cornezuelo. A. nicoyensis* Schenck, Repert. Sp. Nov. 12: 360. 1913 (Puerto Jesús, Golfo de Nicoya, *Tonduz 13538*). *Tauroceras spadicigerum* Britt. & Rose. Thickets and hedges, Meseta Central to the Pacific coast, common in many localities. Ranging to Mexico. A shrub or small tree, of the same group as *A. costaricensis*, the spines as much as 8 cm. long; pinnae 10–12-jugate, the leaflets numerous, linear, 5–7 mm. long; flowers yellow, in very dense spikes 1–2.5 cm. long; fruit terete, inflated, indehiscent, terminated by an elongate spine. Pittier reports the Térraba name of Unka-guá.

Acacia tenuifolia (L.) Willd. Pacific tierra caliente. Mexico to Brazil. A scandent shrub, very prickly, the prickles short; pinnae and leaflets numerous, the leaflets linear, the costa close to the margin; flowers capitate; pod flat, oblong, 7–11 cm. long, 2–3 cm. wide.

It is probable that several other species of *Acacia* exist in Costa Rica. A few others have been reported, but they are not listed here because no specimens of them have been seen, and the determinations may have been incorrect.

ALBIZZIA Durazz.

Unarmed trees; leaves bipinnate; flowers capitate, umbellate, or spicate, small; stamens numerous, united near the base, exserted; legume broadly linear, flat, dehiscent or indehiscent.—Other species are known from Central America.

Albizzia adinocephala (Donn. Sm.) Britt. & Rose ex Record, Trop. Woods 10: 22. 1927. *Gavilana. Pithecolobium adinocephalum* Donn. Sm. Bot. Gaz. 57: 419. 1914. *P. discolor* Pittier, Contr. U. S. Nat. Herb. 20: 464. 1922 (La Verbena, near San José, 1,000 meters, *Tonduz 9077*). La Verbena, *Tonduz 8932*. Meseta Central to the Pacific coast, and in the Atlantic tierra caliente. Panama to British Honduras. A tree of 6–18 meters; pinnae 1–3-jugate, the leaflets 2–5-jugate, lanceolate or ovate, 2–6 cm. long, glabrous, pale beneath; flowers small, white, in paniculate heads; legume 10–17 cm. long, 1.5–2 cm. wide, glabrous.

Albizzia caribaea (Urban) Britt. & Rose. Reported for Costa Rica, the locality not indicated. Panama to Venezuela and the

Antilles. A medium-sized tree; pinnae 5–10-jugate, the leaflets numerous, linear, 5–11 mm. long; flowers in small heads; legume 6–14 cm. long.

Albizzia nicoyana Britt. & Rose, N. Amer. Fl. 23: 47. 1928. Forests and hedges of Nicoya, *Tonduz 13885*. Endemic. A large tree; pinnae 5–6-jugate, the leaflets about 8-jugate, oblique-oblong, 1–2.5 cm. long, acute, puberulent beneath; flowers umbellate. The fruit is unknown, and the reference of the tree to *Albizzia* is questionable.

Albizzia longepedata (Pittier) Britt. & Rose ex Record, Trop. Woods 11: 14. 1927. *Cenícero macho. Pithecolobium longepedatum* Pittier, Contr. U. S. Nat. Herb. 20: 464. 1922. El Coyolar, near Orotina, 100–200 meters, *Wercklé*. Guatemala to Venezuela. A tall, deciduous tree; pinnae 2–4-jugate, the leaflets 3–7-jugate, ovate or obovate, 1.5–4 cm. long, pubescent; flowers umbellate, the stamens pink; legume pubescent, 15 cm. long.

CALLIANDRA Benth.

Herbs, shrubs, or small trees; leaves bipinnate, without glands; flowers in pedunculate heads, these axillary or in terminal racemes; stamens numerous, the filaments united to form a tube or sheath; legume linear, flat, elastically dehiscent by 2 valves.—Other species are known from Central America.

Calliandra Brenesii Standl., sp. nov.—Frutex erectus 2–2.5 m. altus, ramis teretibus ochraceis glabris, internodiis elongatis; stipulae persistentes rigide lineari-subulatae ca. 1 cm. longae attenuatae erectae; folia majuscula brevissime petiolata; pinnae 1-jugae, foliolis 1-jugis coriaceis semiovatis 9–15 cm. longis 3.5–6.5 cm. latis subobtuso-acuminatis, basi semirotundatis, glabris, lucidis, e basi 3-nerviis, nervis utrinque prominentibus; capitula dense multiflora graciliter longipedunculata axillaria pauca, bracteis rigidulis linearilanceolatis parvis; calyx glaber 2.5 mm. longus late dentatus; corolla glabra 11 mm. longa; filamenta ut videtur purpurea ca. 3.5 cm. longa; legumen glabrum ca. 10 cm. longum et 12 mm. latum acuminatum basin versus longe attenuatum.—Cataratas de San Ramón, May, 1931, *Brenes 13180* (type in Herb. Field Mus.); also *Nos. 13503* and *13410* from the same locality; entre Cataratas y La Balsa de San Ramón, 700–800 meters, *Brenes 4424;* El Silencio de Tilarán, *Brenes 15677;* Aguacate, *Oersted 4308*.

Calliandra confusa Sprague & Riley. *Carboncillo, Pelo de ángel. Anneslia confusa* Britt. & Rose. Thickets of the central region; San Ramón. Ranging to Guatemala. A shrub of 1–3 meters, glabrous almost throughout; pinnae about 15-jugate, the leaflets numerous, acute, linear, 6–8 mm. long, acute; flower heads in long racemes, the stamens red. A showy plant because of the handsome stamens, which are about 4 cm. long. Costa Rican specimens of this species have been referred to *C. grandiflora* Benth.

Calliandra costaricensis (Britt. & Rose) Standl., comb. nov. *Anneslia costaricensis* Britt. & Rose, N. Amer. Fl. 23: 67. 1928. Río Convento, Valle del Río Diquís, *Pittier 10643*. Thickets about San José. Endemic. Plants glabrous; pinnae 3-jugate, the leaflets 10–15-jugate, oblong, 2–2.5 cm. long, acute, pale beneath; flower heads axillary; legume 8 cm. long.

Calliandra Cumingii Benth. Material has been seen from Barba, Villa Colón and Guanacaste. Also in Panama. A small shrub; pinnae 2–3-jugate, the leaflets numerous, oblong-linear, 4–6 mm. long, almost glabrous; flowers pubescent, the stamens purple.

Calliandra mollis Standl. Contr. U. S. Nat. Herb. 17: 431. 1914. *Anneslia mollis* Britt. & Rose, N. Amer. Fl. 23: 65. 1928. Thickets near Nicoya, *Tonduz 13536*. Endemic. A slender shrub, the branches pilose; pinnae 3–6-jugate, the leaflets 7–22-jugate, oblong, 8–12 mm. long, pubescent; heads axillary, the flowers glabrous, the stamens white.

Calliandra pallida (Britt. & Rose) Standl., comb. nov. *Anneslia pallida* Britt. & Rose, N. Amer. Fl. 23: 65. 1928. Pastures of La Cruz de Guanacaste, *Pittier 2727*. Endemic. A shrub, the pinnae 2–4-jugate, the leaflets 14–16-jugate, narrowly oblong, 4–6 mm. long, acute, glabrous; heads axillary, the flowers glabrous.

Calliandra portoricensis (Jacq.) Benth. *Carboncillo blanco.* Regions of Cartago and San Ramón, and probably elsewhere. Ranging to Mexico and the Antilles. A slender shrub of 1–3 meters, glabrous or somewhat pubescent; pinnae 2–6-jugate, the leaflets numerous, linear, 8–16 mm. long; heads axillary, the flowers white.

Calliandra Seemannii Benth. Nicoya, 180 meters. Ranging to Colombia. A shrub of 1–3 meters; leaves with 3 leaflets, these oblong, acute, 2.5–5 cm. long, glabrous; heads axillary, the few flowers glabrous, the stamens red.

Calliandra similis Sprague & Riley, Kew Bull. 372. 1923. *Carboncillo, Carboncillo rojo. Anneslia similis* Britt. & Rose, N. Amer. Fl. 23: 71. 1928. Near San José, *Oersted 56.* Common in thickets of the Meseta Central. Endemic. A shrub of 1.5–3 meters, with few branches; pinnae 9–11-jugate, the leaflets numerous, oblong, obtuse, 3–4 mm. long, almost glabrous; heads in elongate racemes, the flowers glabrous, the stamens purple-red; legume 8 cm. long, pilose.

Calliandra tetragona (Willd.) Benth. *Carboncillo.* Meseta Central and Guanacaste. Mexico to Ecuador. A shrub of 2–3 meters, the branches 4-angulate; pinnae 4–7-jugate, the leaflets numerous, oblong-linear, 6–12 mm. long; heads axillary, the flowers glabrous, the stamens white; legume glabrous.

Calliandra Tonduzii (Britt. & Rose) Standl. Field Mus. Bot. 4: 309. 1929. *Anneslia Tonduzii* Britt. & Rose, N. Amer. Fl. 23: 61. 1928. Bonica(?), *Tonduz 4544.* Guatemala to Panama. A shrub or tree of 3–8 meters; pinnae 1-jugate, the leaflets 10–16-jugate, oblong, acute, glabrous; heads axillary, the flowers glabrous, purple-red; legume glabrous. In Panama this species is sometimes given the name of Aromo.

DESMANTHUS Willd.

There are other species in Central America, and probably also in Costa Rica.

Desmanthus depressus Humb. & Bonpl. *Acuan depressum* Kuntze. Thickets of the plains of Guanacaste, and probably elsewhere. A species of wide distribution in America. Plants herbaceous, unarmed, the stems 20–40 cm. long, prostrate or ascending; leaves bipinnate, the pinnae 1–4-jugate, the leaflets numerous, linear, glabrous, 3–5 mm. long; flowers small, white, in axillary heads; stamens 10; legume linear, flat, 2–6 cm. long, 3 mm. wide.

ENTADA Adans.

Large, woody vines, unarmed; leaves bipinnate, with numerous leaflets; flowers small, spicate; stamens 10, free, the anthers provided with a small, terminal gland; legume large, flat, composed of joints that separate from each other and from the continuous margin, which remains entire.—One other species that grows in Central America perhaps extends to Costa Rica.

Entada gigas (L.) Fawcett & Rendle. *Habilla. E. scandens* Benth. Forests of the tierra caliente. Of wide distribution in tropics of both hemispheres. A large vine, as much as 50 meters in length, climbing over tall trees; pinnae 1–2-jugate, the leaves terminated by a tendril, the leaflets 4–5-jugate, oblong, 2–8 cm. long; flowers greenish yellow; pods 1–2 meters long, the 10–12 seeds dark brown or blackish, lustrous, 5–6 cm. broad, with a very hard perisperm. The bark is astringent and medicinal properties are ascribed to the seeds, which are one of the reputed remedies for snake bites. Pittier states that the hollowed seeds are employed by some of the Indians as containers to protect cartridge caps. The seeds often are found on sea beaches, and ocean currents sometimes carry them to remote shores.

Entada polystachia (L.) DC. *Parra rosa. Entadopsis polystachia* Britton. Pacific coast, and probably elsewhere. Mexico to Brazil. A large vine, almost glabrous; pinnae 2–6-jugate, the leaflets 6–8-jugate, oblong or obovate, 2–4 cm. long, the leaves without tendrils; flower spikes disposed in dense panicles, the flowers green; pods 20–40 cm. long, 5–8 cm. wide, the seeds 1 cm. broad. In Nicaragua this species is known by the name Bejuco de hierro.

ENTEROLOBIUM Mart. Ear tree

Another Central American species occurs in Guatemala and Panama.

Enterolobium cyclocarpum (Jacq.) Griseb. *Guanacaste.* Abundant in the Pacific tierra caliente, ascending to 900 meters. Mexico to Venezuela. One of the largest trees of Central America, as much as 30 meters high, with a trunk 2 meters in diameter but usually short; leaves bipinnate, with very numerous small, narrow leaflets; flowers small, white, capitate; pod curved into a short, dark brown spiral that is suggestive of an ear. The wood is brown, not very heavy, fairly durable, and susceptible of a high polish. It is one of the important timbers of Costa Rica, being used for many kinds of construction. It is sometimes exported to the North, where it is employed for interior finish. The leaves are put forth continuously, so that the tree is never bare. The leaflets fold together during the night. The fallen leaves are eaten greedily by cattle. The tree is one of the most celebrated ones of Central America, the huge, isolated individuals, with their broad crowns, often being conspicuous features of the landscape. The word *guanacaste,* which

gives its name to the Costa Rican province of Guanacaste, is of Nahuatl origin and signifies "ear tree." The name employed in Panama is Corotú. Indian names recorded from Costa Rica are Kurú (Cabécara); Kudshir (Bribrí); Krukrá (Brunka); Shoró (Térraba).

INGA Scop.

Reference: Pittier, Contr. U. S. Nat. Herb. 18: 173. 1916.

Unarmed trees or shrubs; leaves pinnate, the petiole and rachis often winged, the leaflets large; flowers rather large, whitish, in heads, umbels, spikes, or racemes; stamens numerous, elongate, exserted, united below to form a sheath; fruit elongate and compressed, terete, or 4-angulate, indehiscent, the seeds surrounded by pulp.—A very large genus, with about 60 species in North America. They are mostly medium-sized trees with broad, dense crowns, and are found in almost all regions of Central America, but in greatest abundance in the tierra caliente, especially along streams. The pulp of the fruit is edible in some species, being white and juicy, sweet, and of agreeable flavor. The pods, some of them of great size, often are seen in Central American markets. The trees of this genus are considered best of all for coffee shade, and are planted for that purpose in all regions of Central America. In Costa Rica the usual name for the tree is Cuajiniquil, a word of Nahuatl origin. The name Guavo is used in Panama, and Guamo in Honduras.

Inga aestuariorum Pittier, Contr. U. S. Nat. Herb. 18: 183. *pl. 89.* 1916. Boca Zacate, Delta del Diquís, *Tonduz 6793*. Known only from the original collection. A small tree; leaf rachis not winged, the leaflets 5–6-jugate, elliptic or oblong, obtuse, pubescent; flowers spicate, the calyx 7 mm. long, the corolla white, 18 mm. long, sericeous; pods linear, 14–20 cm. long, 1.7 cm. wide, flat, almost glabrous.

Inga Biolleyana Pittier, Contr. U. S. Nat. Herb. 18: 207. 1916. Pastures near Turrialba, *Tonduz 8391*. Also in Nicaragua. Rachis not winged, the leaflets 2–3-jugate, acute, pilose beneath; flowers capitate, the calyx 10–12 mm. long, the corolla 3 cm. long, sericeous.

Inga Brenesii Standl., sp. nov. *Guavo peludo.*—Arbor 5–8-metralis, corona rotundata, ramulis crassis angulatis vel subteretibus dense pilis brevibus patentibus brunnescentibus hirsutis, internodiis brevibus; folia majuscula breviter petiolata, petiolo exalato, rhachi inter pares foliolorum late alata ad 1.5 cm. lata, glandulis inter

foliola magnis elevatis; foliola trijuga late elliptica vel obovato-elliptica crasse coriacea usque ad 14 cm. longa atque 8 cm. lata apice breviter acute acutata vel interdum fere rotundata et apicata, basi obtusa vel subrotundata, supra lucidissima in juventute hirsuta et ad costam densissime hirtella, in statu adulto glabrata, costa elevata, nervis lateralibus impressis, subtus opaca brunnescentia persistente breviter hirsuta, costa valde elevata, nervis lateralibus gracilibus elevatis, venulis prominentibus laxe reticulatis; flores magni spicati, spicis brevibus dense multifloris, rhachi vix ultra 2 cm. longa, bracteis parvis deciduis inconspicuis, pedunculo crasso axillari solitario ad 4.5 cm. longo brunneo-hirsuto; calyx tubulosus 1 cm. longus dense pilis brunnescentibus brevibus hispidulus, dentibus brevibus late ovatis vix 2 mm. longis; corolla 2 cm. longa densissime pilis longis fulvis sericeo-strigosa, lobis lineari-lanceolatis attenuatis 5 mm. longis; filamenta numerosissima corolla duplo longiora.—In forest and clearings, La Palma de San Ramón, 1,050–1,100 meters, *Brenes 5121* (type in Herb. Field Mus.), *4988*. Somewhat suggestive of *I. spectabilis* in its large, coriaceous leaflets.

Inga confusa Britt. & Rose. Atlantic tierra caliente. Also in Panama. Rachis not winged, the leaflets 5–6-jugate, oblong, acuminate, pubescent; flowers in short spikes, the calyx 4 mm. long, the corolla 7–8 mm. long, pubescent; pods 10–12 cm. long, 2–2.5 cm. wide, pubescent.

Inga edulis Mart. *Cuajiniquil, Guavo.* Tierra caliente of both coasts, and in coffee plantations of the Meseta Central. A species of wide distribution. A tree about 10 meters high; rachis winged, the leaflets 4–6-jugate, oval or oblong, acuminate, almost glabrous or pubescent; flowers white, in short spikes, the calyx 5–8 mm. long, the corolla pilose, 15–18 mm. long; pods subterete, 30 cm. long or more, tomentose, costate. Planted commonly for coffee shade. Indian names reported are: Seuí (Cabécara); Ataña (Bribrí); Tsoeib-krá (Brunka); Súremna, Seuí (Térraba); Spuru-ña (Guatuso).

Inga eriorhachis Harms, Repert. Sp. Nov. 13: 525. 1915. *Cuajiniquil.* Santa María de Dota, 1,450 meters, *Tonduz 11636*. Also in the region of Cartago, 1,400–1,500 meters; region of San Ramón, at 850 meters. Endemic. A tree of 6–10 meters; branchlets covered with short, brown hairs; rachis narrowly winged between the upper leaflets, naked between the lower ones; leaflets 4–5-jugate, densely pubescent; flowers spicate, the calyx 6–7 mm. long, pilose, the corolla 12–14 mm. long, densely pilose.

Inga Goldmanii Pittier. Atlantic tierra caliente. Also in Panama. A tree of 6–10 meters; rachis winged, the leaflets 3–4-jugate, obtuse or acute, pubescent beneath or almost glabrous; flower spikes 4–5 cm. long, the calyx 14 mm. long, densely pubescent, the corolla 2.5 cm. long, tomentose; pods flat, 20 cm. long, 3.5–4.5 cm. wide, covered with long, brown hairs.

Inga Jimeneziana Pittier, Contr. U. S. Nat. Herb. 18: 208. 1916. *Guavo.* Río Colorado, near Turrialba, *Tonduz 8333.* Atlantic tierra caliente; region of San Ramón. Also in Panama. A tree of 8–12 meters with rounded crown; rachis narrowly winged, the leaflets 3–4-jugate, large, acuminate, pilose beneath; bractlets narrow and elongate; flowers spicate, the stamens white; calyx 11–13 mm. long, pubescent, striate, the corolla 3 cm. long, pilose; pods 10–30 cm. long, 3 cm. wide, flat, glabrous.

Inga latipes Pittier, Contr. U. S. Nat. Herb. 18: 183. 1916. Las Vueltas de Tucurrique, 1,000 meters, *Tonduz 13056.* Endemic. Rachis not winged, the leaflets 3-jugate, sparsely pubescent or almost glabrous; flowers spicate; pods flat, 9–30 cm. long, 4 cm. wide.

With little doubt there grows in Costa Rica *I. laurina* (Swartz) Willd., a common species in many parts of Central America, but I have seen no Costa Rican specimens.

Inga leptoloba Schlecht. *Cuajiniquil.* Meseta Central to the coasts. Mexico to Panama. A medium-sized or large tree; rachis not winged, the leaflets 2–3-jugate, lanceolate, acute, almost glabrous; flowers in short spikes, the calyx 4 mm. long, the corolla 8 mm. long, sericeous; pods as much as 15 cm. long and 2.5 cm. wide, puberulent. A common species in the neighborhood of San José.

Inga longispica Standl., sp. nov.—Ramuli crassuli teretes ochracei vel brunnescentes lenticellis numerosissimis magnis conspersi; folia breviter petiolata, rhachi gracili exalata fere glabra ca. 5 cm. longa, glandulis inter pares foliolorum parvis; foliola trijuga lanceolato-oblonga ad 11 cm. longa et 4 cm. lata sensim vel subabrupte longe attenuato-obtuso-acuminata, basi acuta vel subobtusa, subcoriacea, supra in sicco fusca lucidissima glabra vel secus costam basim folioli versus minute strigillosa, costa gracili prominente, subtus pallidiora glabra, costa elevata; flores parvi spicati, spicis axillaribus pedunculatis pedunculo incluso ad 17 cm. longis sparse minute puberulis vel glabratis, bracteis minutis deciduis;

calyx campanulatus vix ultra 2 mm. longus acute dentatus minutissime sparse strigillosus; corolla 5–6 mm. tantum longa sparse minute strigillosa vel glabrata, supra paullo dilatata, lobis lanceolato-triangularibus tubo fere duplo brevioribus; stamina numerosa corolla plus quam duplo longiora.—La Palma de San Ramón, October, 1928, *Brenes 6371* (type in Herb. Field Mus.). Remarkable for the small flowers and greatly elongate flower spikes.

Inga marginata Willd. *Cuajiniquil.* Common almost everywhere in the tierra caliente; region of San Ramón. Extending to Brazil. A tree of 6–12 meters; rachis winged, the leaflets usually 2-jugate, oblong or lanceolate, 7–10 cm. long, almost glabrous; flowers spicate, the stamens white, the calyx only 1 mm. long, the corolla 4 mm. long, pubescent; pods flat, 5–12 cm. long, 1 cm. wide, glabrous.

Inga mollifolia Pittier, Contr. U. S. Nat. Herb. 18: 189. 1916. *Guava, Guavillo.* Rodeo de Pacaca, *Pittier 3251.* Also in Cantón de Dota and region of San Ramón. Endemic. A tree of 5–10 meters; rachis narrowly winged, the leaflets 3–5-jugate, acuminate, pilose; flowers in very short spikes, the calyx 5–6 mm. long, pubescent, the corolla 8–10 mm. long, pilose.

Inga multijuga Benth. Golfo Dulce. Guatemala to Panama. A tree of 4–12 meters; rachis not winged, the leaflets 5–10-jugate, acute or acuminate, pubescent beneath; spikes short, the calyx 7–8 mm. long, the corolla 25 mm. long.

Inga Oerstediana Benth. Meseta Central. Ranging to Venezuela. Rachis narrowly winged, the leaflets 4–5-jugate, obtuse, densely pubescent; flowers spicate, the calyx pubescent, 6 mm. long, the corolla 12–14 mm. long, pubescent; pods elongate, terete.

Inga Paterno Harms. Common in the regions of Cartago, San José, and Alajuela, often planted for coffee shade. Extending to southern Mexico. A medium-sized tree; rachis not winged, the leaflets 4–5-jugate, acute or acuminate, glabrous; flowers whitish, capitate, glabrous, the calyx 1–2 mm. long, the corolla 5–7 mm. long; pods flat, glabrous, 9–12 cm. long, 4–5 cm. wide, with 2 or 3 seeds. This species is known in Salvador by the name Paterno. The pulp of the pods is edible.

Inga Pittieri Micheli, Bull. Herb. Boiss. 2: 446. 1894. Río Ceibo, near Buenos Aires, *Tonduz 4977.* Collected also at Juan Viñas and Santo Domingo de Osa; region of San Ramón, at 1,000

meters. Panama. A tree of 8–12 meters; rachis winged, at least between the upper leaflets, the leaflets 1–3-jugate, acuminate, large, pubescent; flowers spicate, the calyx 8–13 mm. long, striate, the corolla 20–24 mm. long, strigose; pods 9–18 cm. long, 1.5 cm. wide, thick, 4-angulate, glabrous.

Inga portobellensis Beurling. Golfo Dulce. Also in Panama. A tree with glabrous branchlets; rachis winged, the leaflets 2-jugate, large, glabrous; flowers in large heads, the calyx 25–35 mm. long, glabrous; corolla 3.5–4 cm. long, almost glabrous; pods 15 cm. long, 2.5 cm. wide. Easy to recognize because of the large calyx.

Inga punctata Willd. *Cuajiniquil, Guavo.* Meseta Central and Cantón de Dota, extending to the coasts. Guatemala to Venezuela. A tree of 5–12 meters; rachis not winged, the leaflets 2–3-jugate, acuminate, sparsely pubescent; flowers in short spikes, the calyx 4 mm. long, strigose, the corolla 8 mm. long, sericeous, the stamens white; pods as much as 15 cm. long, 1.5–2.5 cm. wide, puberulent.

Inga Roussoviana Pittier. Golfo Dulce. Guatemala to Panama. A tree of 3–8 meters; rachis not winged, the leaflets 3–4-jugate, acute, almost glabrous; flowers in paniculate umbels, the calyx 5 mm. long, pubescent, the corolla 9–11 mm. long; pods flat, 11–17 cm. long.

Inga spectabilis (Vahl) Willd. *Guava machete.* Common in the tierra caliente. Ranging to Colombia. A tree of 6–15 meters; rachis winged, the leaflets 1–3-jugate, very large, coriaceous, almost glabrous; flowers in short spikes, the calyx 7–8 mm. long, pubescent, the corolla 18 mm. long, sericeous; pods 30–60 cm. long, 4–7 cm. wide. A species distinguished by its very large pods. The leaflets also are larger and thicker than in other species.

Inga spuria Humb. & Bonpl. *Cuajiniquil.* Common in the Meseta Central, extending to the Pacific coast. Mexico to Venezuela. A tree of 4–12 meters; rachis winged, the leaflets 5–6-jugate, 7–10 cm. long, pubescent; flowers in short racemes, the calyx 15 mm. long, the corolla 2 cm. long, sericeous; pods subterete, densely pubescent, elongate. Pittier reports the following Indian names: Guaromá (Cabécara); Sauí, Seuí (Bribrí); Guarób-ua (Brunka); U-gurok, Gruok (Térraba).

Inga stenophylla Standl., sp. nov.—Ramuli graciles ochracei vel brunnescentes plus minusve angulati lenticellis numerosissimis

conspersi, internodiis brevibus; folia inter minora breviter petiolata, rhachi gracili angustissime alata vel fere exalata glabrata, glandulis inter foliola minutis; foliola 5–7-juga anguste oblongo-lanceolata vel lineari-lanceolata 5–8 cm. longa 1–1.7 cm. lata longissime attenuato-acuminata, basi acuta vel obtusa, supra in sicco fusca plus minusve lucida primo sparse subadpresse pilosa cito glabrata, costa gracili prominente, nervis lateralibus obsoletis, subtus multo pallidiora primo sparse hispidula glabrescentia, costa gracili pallida prominente, nervis lateralibus numerosis pallidis prominulis; flores parvi spicati, spicis axillaribus et solitariis vel paniculatis pedunculatis, pedunculo incluso ad 4 cm. longis densissime multifloris, bracteis minutis deciduis, pedunculo dense breviter fulvo-hispidulo; calyx campanulatus 2–2.5 mm. longus fulvo-hispidulus brevissime dentatus; corolla ca. 6 mm. longa adpresso-hispidula supra paullo dilatata, lobis brevibus vix ultra 1.5 mm. longis; stamina numerosa valde elongata; legumen compressum lineare paullo curvatum ca. 22 cm. longum et 1.5 cm. latum apice rotundatum et apiculatum sparse hispidulum, marginibus anguste incrassatis.—Entre Santiago y San José de San Ramón, April, 1929, *Brenes 6841* (type in Herb. Field Mus.); Santiago de San Ramón, *Brenes 6707*; La Palma de San Ramón, *Brenes 5802*; La Calera de San Ramón, 650–700 meters, *Brenes 11574*.

Inga Tonduzii Donn. Smith, Bot. Gaz. 44: 112. 1907. *Guavo, Guavo peludo, Guavo peludo verde.* Las Vueltas de Tucurrique, *Tonduz 12928*. Also about Cartago and San Ramón. Endemic. Branchlets covered with long hairs; rachis broadly winged, the leaflets 2–3-jugate, pilose; flowers in short spikes, the calyx 10 mm. long, pilose, the corolla 27 mm. long, covered with long hairs; pods 17–23 cm. long, 3.5–4 cm. wide, flat, covered with long, brown hairs.

Inga venusta Standl., sp. nov. *Guavo amarillo.*—Ramuli crassi dense lenticellati glabrati; folia breviter petiolata coriacea, petiolo late alato, rhachi inter foliola late alata ad 1 cm. lata, glandulis parvis elevatis; foliola 3-juga anguste oblonga vel lanceolato-oblonga 8–12 cm. longa 2.5–4 cm. lata apicem obtusum versus paullo angustata, basi rotundata vel obtusa, supra in sicco griseo-fusca glabra, costa gracili elevata, nervis lateralibus numerosis subimpressis, subtus brunnescentia glabra vel glabrata, costa gracili elevata, nervis lateralibus quoque elevatis, venulis inconspicuis laxe reticulatis; flores mediocres breviter spicati, spicis capituliformibus vix 2 cm. longis, pedunculis axillaribus interdum subpaniculatis ca. 2 cm. longis sparse puberulis vel fere glabris, bracteis minutis deciduis;

calyx tubulosus 1 cm. longus striatus sparsissime strigillosus vel fere glaber, dentibus minutis; corolla fere 2 cm. longa extus pilis longis fulvis densissime sericea, lobis anguste lanceolatis attenuatis.—La Palma de San Ramón, August, 1928, *Brenes 6256* (type in Herb. Field Mus.). Evidently conspecific is a sterile collection (*Brenes 6255*) from the same locality. In this the leaflets are 4 pairs and as much as 17 cm. long and 5 cm. wide.

LEUCAENA Benth.

Unarmed shrubs or trees; leaves bipinnate, the petiole or rachis usually provided with a small gland; flowers white, in pedunculate heads; stamens 10, exserted; pods linear or oblong, flat, dehiscent, the seeds placed obliquely.—Other species occur in Central America.

Leucaena glauca (L.) Benth. Hedges near San José. A species of wide distribution in tropical regions. A shrub or tree of 2–5 meters; pinnae 3–10-jugate, the leaflets numerous, linear-oblong, 8–15 mm. long, pale beneath; flower heads axillary or terminal, 1.5–3 cm. wide; pods 10–15 cm. long, 1.5 cm. wide, finely pubescent.

LYSILOMA Benth.

Unarmed shrubs or trees; leaves bipinnate; flowers small, whitish, racemose, spicate, or capitate; stamens numerous, the filaments united to form a tube; pods flat, the valves separating at maturity from the persistent margin.—Other species are known from Central America.

Lysiloma desmostachys Benth.(?). Hemsley reports for Costa Rica (Puntarenas, *Oersted*) *L. Schiedeanum* Benth., a synonym of *L. auritum* (Schlecht.) Benth. This species is known only from Mexico, and it is probable that the Costa Rican plant is *L. desmostachys*, the only spicate-flowered species known from Central America.

Lysiloma Seemannii Britt. & Rose. In thickets, regions of San Ramón and the Pacific coast; Guanacaste. Described from Central America, the special locality not known. A shrub or small tree, glabrous or nearly so; stipules large, triangular-ovate, auriculate, but soon deciduous; pinnae about 6 pairs, the leaflets about 25 pairs, linear, 6–8 mm. long, obtuse; flowers in pedunculate heads, the peduncle bracted near the middle; calyx 1 mm. long, the corolla 1.5 mm. long, puberulent; fruit 12 cm. long and 16–18 mm. wide.

MIMOSA L.

Herbs, shrubs, or trees, sometimes scandent; leaves bipinnate; flowers small, spicate or capitate; stamens of the same number as the corolla segments or twice as many, distinct, exserted; pods linear or oblong, flat, the valves continuous or usually transversely articulate.—Other species of this vast genus are known from Central America.

Mimosa albida Humb. & Bonpl. *Dormilona. M. floribunda* Willd. Common in thickets, Meseta Central to the Pacific coast. Mexico to Brazil. A prickly shrub 1–3 meters high; pinnae 1-jugate, the leaflets 2-jugate, oblique, acute or obtuse, 3–8 cm. long pubescent; flowers pink, capitate, the stamens as many as the corolla segments; pods 1–3 cm. long, strigose.

Mimosa Calderonii Britt. & Rose. Reported for Costa Rica, without indication of the locality, but probably in the Pacific coast. Extending to Chiapas. A shrub, the branches glandular-pubescent and prickly; pinnae 6–9-jugate, the leaflets numerous, linear-oblong, 4–6 mm. long; flowers pink, capitate; pods 2–2.5 cm. long, glandular-pubescent.

Mimosa costaricensis Benth. Trans. Linn. Soc. 30: 423. 1875. Aguacate, *Oersted*. Region of San Ramón. A shrub, tomentose, prickly; pinnae 4–8-jugate, the leaflets 10–15-jugate, oblong, 6–8 mm. long, pubescent; flowers in paniculate heads; stamens 8 or 10.

Mimosa dormiens Humb. & Bonpl. Dry plains near Bebedero, Guanacaste. Mexico to Brazil. Plants herbaceous or nearly so, prostrate, the branches strigose and prickly; pinnae 3–6-jugate, the leaflets 6–20-jugate, oblong, 4–8 mm. long; flowers capitate; stamens 8; pods 12 mm. long, 8 mm. wide, pubescent.

Mimosa flavescens Splitgerber. Reported for Costa Rica, without indication of the locality; probably in the Pacific coast. Mexico to the Guianas. Plants suffrutescent, erect or decumbent, prickly or unarmed, pilose; pinnae 2–6-jugate, the leaflets numerous, linear, 4–6 mm. long; flowers capitate; stamens 8; pods linear-oblong, 8–15 mm. long, 4 mm. wide.

Mimosa guanacastensis Standl., sp. nov.—Frutex, ramis crassis rigidis teretibus subferrugineis inermibus vel sparse aculeolatis setulis brevibus basi incrassatis adscendentibus vel subadpressis dense conspersis, aculeolis 5 mm. longis rectis basi valde incrassatis;

folia parva circiter 1 cm. longe petiolata, pinnis 1-jugis 1.5–3 cm. longis, petiolo ut rhachi dense setuloso et pilosulo vel puberulo; foliola 6–9-juga 8–12 mm. longa 2.5–3.5 mm. lata oblonga acuta vel subacuta subcoriacea basi subrotundata supra pilosula vel puberula enervia subtus dense adpresso-setulosa et pilosa, ad margines dense adpresso-setuloso-ciliata; stipulae rigidae lanceolato-subulatae persistentes; flores capitati, capitulis globosis ad 8 mm. diam. densissime multifloris axillaribus, pedunculis gracilibus ad 2 cm. longis adpresso-hispidulis; calyx minutus margine filiformi-laciniatus; corolla 2.5 mm. longa inferne glabra ad dentes puberula; stamina lobis corollae isomera.—Entre Guachipelín y Liberia, Guanacaste, *Brenes 15583* (type in Herb. Field Mus.); also *No. 15496* from the same region.

Mimosa invisa Mart. *Dormilona.* Meseta Central to the coasts. A species of wide distribution in America. A scandent shrub, armed with innumerable hooked prickles, the branches angulate; pinnae 4–8-jugate, the leaflets numerous, oblong-linear, 3–5 mm. long; flowers purple-pink, capitate; stamens 8; pods 1–2.5 cm. long, 5–6 mm. wide, setose. Of this species Pittier says: "This plant invades abandoned land in regions of low elevation. Its roots have a disagreeable odor and possess irritant and even toxic properties. The infusion of the leaves is very bitter and is used as a tonic; the seeds are sometimes employed as an emetic. Cattle occasionally eat the plant." It is a serious pest in cultivated ground, smothering other plants with its long, tangled stems. Its sharp prickles tear the flesh severely if the plant is approached without proper caution.

Mimosa panamensis (Benth.) Standl. Golfo Dulce; region of San Ramón, at 1,200 meters. Also in Panama. Plants herbaceous or suffrutescent, the branches setose and prickly; pinnae 1-jugate, the leaflets 2-jugate, oblong-obovate, 1–3 cm. long, strigose; flowers capitate; stamens 5; pods 10–18 mm. long, 5–6 mm. wide, setose.

Mimosa pigra L. *Dormilona, Dormilona grande. M. asperata* L. Abundant in wet or swampy places, often growing in shallow water, Meseta Central to the Pacific coast, and probably also in the Atlantic. A species of wide distribution in tropical regions. A shrub of 1–2 meters, prickly, the branches setose; pinnae 7–15-jugate, the leaflets numerous, linear, 5–8 mm. long, pubescent; flowers pink, capitate; stamens 8; pods 3–8 cm. long, 10–12 mm. wide, hispid. A characteristic plant of open swamps and margins of streams and lakes.

Mimosa polydactyla Humb. & Bonpl. Carrillos de Poás cerca del puente del Río Poás, *Brenes 19293*. Ranging to Venezuela and Brazil. Plants suffrutescent, hirsute to glabrate, often setose and aculeolate, slender; pinnae 3–5 pairs, approximate at the end of the petiole, the leaflets 30–60 pairs, linear, 4–6 mm. long, glabrous, appressed-setulose on the margins; flowers pink, capitate, the heads racemose, pedunculate; stamens 4; fruit oblong, 1–1.5 cm. long, 4 mm. wide, the valves and margins long-setose.

Mimosa pudica L. *Dormilona, Puta vieja, Nauapate* (fide Pittier). Abundant in abandoned fields and cultivated or waste ground, Meseta Central to the coast. Almost pantropic in distribution. Plants low and herbaceous, prickly; pinnae 1–2-jugate, the leaflets numerous, linear, 6–10 mm. long; flowers pink, capitate, with 4 stamens; pods 1–1.5 cm. long, setose on the margins. An abundant plant in almost all inhabited parts of Central America, often growing profusely about dwellings. Noteworthy for its "sensitive" leaves, whose leaflets quickly fold together when touched, or during cloudy weather. This characteristic is shared, of course, with many other members of the Mimoseae. Indian names reported are Dika-kerik, Kerebi-kerik (Cabécara); De-kra-dike (Bribrí); Tshu-tsha (Brunka); Shku-shó, Kop-kuo-shkú (Térraba). The plant is sometimes cultivated in northern hothouses as a curiosity.

Mimosa Skinneri Benth. *M. Pittieri* Micheli, Bull. Soc. Bot. Belg. 30: 294. 1891 (Río Jesús María, Puntarenas, *Pittier 502*). Meseta Central to the Pacific coast. Ranging to southern Mexico. A densely pilose herb, armed with straight prickles; pinnae 1–2-jugate, the leaflets 4–8-jugate, oblong or obovate, 8–15 mm. long, strigose beneath; flowers capitate, white, with 4 or 5 stamens; pods linear-oblong, puberulent or glabrous, setose on the margins.

Mimosa somnians Humb. & Bonpl. *Dormilona*. Meseta Central to the Pacific coast, in dry thickets. Mexico to Paraguay. A low shrub, prickly and glandular; pinnae 2–8-jugate, the leaflets numerous, linear-oblong, 2–4 mm. long; flowers pink, capitate, with 8 stamens; legume linear, 4–7 cm. long, glandular-pubescent or glabrous.

Mimosa Velloziana Mart. Valley of Río Changuinola, and in Guanacaste; region of San Ramón, at 1,000 meters. Ranging to Paraguay. A more or less scandent shrub, the branches glabrous, armed with prickles; pinnae 1-jugate, the leaflets 2-jugate, 3–4 cm.

long, sparsely setose beneath; flowers capitate, with 4 stamens, white or pinkish white; legume 2 cm. long, glabrous, setose on the margins.

Mimosa Watsonii Robinson. Reported for Costa Rica, without indication of the locality, but probably in the Pacific coast. Ranging to Guatemala. A scandent shrub, armed with very numerous hooked prickles; pinnae 1–3-jugate, the leaflets 1–3-jugate, 1.5–5 cm. long, rounded or obovate, pubescent; flowers in numerous paniculate heads, the stamens 8; legume 5 cm. long, glabrous, unarmed.

NEPTUNIA Lour.

Unarmed, perennial herbs; leaves bipinnate; flowers in axillary, pedunculate heads; stamens 10, distinct, the anthers terminated by a small gland; legume linear or oblong, flat, stipitate, the seeds transverse.

A plant of this genus has been reported from Guanacaste, under the name *N. lutea* Benth., a species of the United States. The Costa Rican plant is presumably either *N. plena* (L.) Benth. or *N. pubescens* Benth., both of which occur in Panama.

PENTACLETHRA Benth.

A single species is known in Central America.

Pentaclethra macroloba (Willd.) Kuntze. *Gavilán. P. filamentosa* Benth. Abundant in forests of the Atlantic tierra caliente. Nicaragua to the Guianas. A tall tree of 10–40 meters; leaves bipinnate, without glands, the pinnae 8–20-jugate, the leaflets numerous, 7–12 mm. long, 1.5 mm. wide, glabrous; flowers small, in racemose spikes, the corolla 8–12 mm. long; stamens 5, the anthers terminated by a gland; legume woody, elastically dehiscent, 20–30 cm. long, 3–4 cm. wide. Pittier states that the presence of this tree is considered an indication that land is suitable for agriculture.

The genus *Piptadenia* probably is represented in Costa Rica, but I have seen neither specimens nor records for the region.

PITHECOLOBIUM Mart.

Shrubs or trees, unarmed or provided with spines or prickles; leaves bipinnate (rarely pinnate in a few Central American species); flowers small, capitate, umbellate, spicate, or racemose; stamens numerous, exserted, united to form a short or elongate tube; fruit

very variable in form.—A large genus, which has many other species in Central America. The generic name was written originally *Pithecellobium*, but the writer prefers to use the name adopted by Bentham and almost all other authors. Because of the highly variable form of the fruit, it is possible to divide the genus into various small ones, as was done by Britton and Rose, but many of their genera are based upon insignificant characters.

Pithecolobium Brenesii Standl., sp. nov.—Arbor 10–15-metralis cauliflora, ramulis gracilibus ferrugineis dense pallido-lenticellatis glabris, internodiis valde elongatis; folia bipinnata subsessilia, pinnis 1-jugis, rhachi ad 17 cm. longa glabra; foliola trijuga breviter petiolulata crasse membranacea glabra elliptico-oblonga vel anguste elliptica 9–14 cm. longa 3–6.5 cm. lata acuminata, basi plus minusve inaequali obtusa vel subacuta, costa subtus gracili elevata, nervis lateralibus prominulis; flores in racemos e ramis vetustis crassis nascentes dispositi, racemis brevibus paucifloris vel multifloris, bracteis subulatis minutis, pedicellis glabris ad 4 mm. longis; calyx glaber campanulatus 2.5 mm. longus truncatus; corolla glabra anguste tubulosa striata fere 2 cm. longa; filamenta ad 3.5 cm. longa purpurea.—Entire Río Jesús y Alto de La Calera de San Ramón, *Brenes 17135* (type in Herb. Field Mus.); San Pedro de San Ramón, *Brenes 22574*. Similar to *P. Englesingii* Standl. of Nicaragua, which has much smaller flowers.

Pithecolobium catenatum Donn. Smith, Bot. Gaz. 48: 294. 1909. *Cojoba catenata* Britt. & Rose, N. Amer. Fl. 23: 32. 1928. Suerre, Llanuras de Santa Clara, Prov. Limón, 300 meters, *J. D. Smith 6479*. Endemic. A shrub; pinnae 1-jugate, the leaflets 3–5-jugate, elliptic or obovate, 3–16 cm. long, acuminate, almost glabrous; flowers in axillary heads; legume 12–22 cm. long, terete, constricted between the seeds.

Pithecolobium costaricense (Britt. & Rose) Standl. Trop. Woods 34: 40. 1933. *Cocobola, Lorito. Cojoba costaricensis* Britt. & Rose, N. Amer. Fl. 23: 31. 1928. La Palma, 1,460 meters, *Tonduz 12503*. Forests of the central mountains, 1,300–1,600 meters; region of San Ramón, at 1,100 meters. Endemic. A tree or shrub of 2.5–8 meters; pinnae 4–7-jugate, the leaflets 10–14-jugate, oblong-lanceolate, 1.5–2.5 cm. long, subacute; flowers white, the calyx 3 mm. long, the corolla 6–7 mm. long; legume red, elongate, constricted between the seeds. The tree is said to furnish good wood.

Pithecolobium dulce (Roxb.) Benth. Thickets of the Pacific coast. Mexico to Venezuela. A small or medium-sized tree, armed with stipular spines; pinnae 1 pair, the leaflets 1 pair, oblong to obovate, obtuse or rounded at the apex, coriaceous, glabrous or somewhat pubescent; flowers whitish, in globose, panicled heads; calyx 2 mm. long, the corolla 3–4 mm. long; fruit curved or coiled, somewhat compressed, glabrate, 8–12 mm. wide.

Pithecolobium glabrum (Britt. & Rose) Standl. Trop Woods 34: 40. 1933. *Cojoba glabra* Britt. & Rose, N. Amer. Fl. 23: 33. 1928. Santa María de Dota, 1,500–1,800 meters, *Standley 41743*. Also at La Estrella, 1,800 meters. Endemic. A tree of 8 meters; leaves pinnate, the leaflets 2-jugate, oblong, 6-12 cm. long, glabrous; legume red, 12–20 cm. long, constricted between the seeds. Easy to recognize because of the simply pinnate, not bipinnate leaves. The leaves are similar to those of *Inga*, but the fruit is altogether different.

Pithecolobium lanceolatum (Humb. & Bonpl.) Benth. Nicoya, and probably in other parts of the Pacific coast. Mexico to Venezuela. A spiny tree of 5–10 meters; pinnae 1-jugate, the leaflets 1-jugate, obtuse or acute, 2–7 cm. long, glabrous; flowers whitish, spicate, the calyx 2–3 mm. long, the corolla 5–6 mm. long; legume almost terete, reddish, 8–14 cm. long, dehiscent.

Pithecolobium latifolium (L.) Benth. *Sotacaballo*. Pacific tierra caliente. Honduras to Brazil, and in the Antilles. A glabrous, unarmed tree; pinnae 1-jugate, the leaflets usually 5, elliptic or oblong, 7–15 cm. long; flowers arising from the thicker branches, purple, in small heads, the calyx 1.5 mm. long, the corolla 6–7 mm. long; legume somewhat curved, flat, 10–30 cm. long, 2–2.5 cm. wide. The tree usually grows along banks of streams, the branches overhanging the water. For this species there have been reported the following Indian names, which may apply to *P. longifolium*: Kitá (Cabécara); Kuéh-krá (Brunka); Kuer (Térraba).

Pithecolobium longifolium (Humb. & Bonpl.) Standl. *Sotacaballo*. *Zygia longifolia* Britt. & Rose; *P. Vahlianum* Benth. A characteristic species of stream banks in the Atlantic tierra caliente; also on the Pacific coast; San Ramón, at 850 meters. Guatemala to Colombia. An unarmed tree of 6–12 meters, glabrous; pinnae 1-jugate, the leaflets 3, oblong or lanceolate, 4–12 cm. long; flowers purple, in short spikes, the calyx 1 mm. long, the corolla 6–7 mm.

long; legume somewhat curved, compressed 15–30 cm. long, 12–15 mm. wide.

Pithecolobium palmanum Standl., sp. nov.—Frutex vel arbor 3-metralis, ramis pallide lenticellatis inermibus, novellis sparse puberulis cito glabratis; stipulae ca. 5 mm. longae lanceolato-subulatae rigidae persistentes; folia sessilia bipinnata, pinnis 1-jugis, rhachi ad 7.5 cm. longa ferrugineo-puberula; foliola 4-juga brevissime petiolulata subcoriacea in sicco plus minusve fusca oblonga vel elliptico-oblonga inaequilatera, superiora paullo majora interdum oblongo-obovata, 3.5–5.5 cm. longa 1.5–2.5 cm. lata obtusa vel acutiuscula, basi suboblique obtusa vel subacuta, glabra, opaca, costa venisque pagina superiore prominentibus, subtus pallidiora venis arcte reticulatis prominulis; flores sanguinei brevissime spicati, spicis ad ramos vetustiores defoliatos nascentibus breviter pedunculatis laxe paucifloris sessilibus, pedunculis ferrugineo-puberulis, bracteis minutis inconspicuis; calyx campanulatus 2 mm. longus glaber vel glabratus brevissime dentatus; corolla glabra anguste tubulosa 1.5 cm. longa striata brevissime dentata, filamentis modice exsertis.—Between San Miguel and La Palma de San Ramón, 1,000–1,050 meters, *Brenes 5496* (type in Herb. Field Mus.); La Palma de San Ramón, *Brenes 6774*.

Pithecolobium racemiflorum Donn. Smith, Bot. Gaz. 56: 57. 1913. *Punjuba racemiflora* Britt. & Rose, N. Amer. Fl. 23: 28. 1928. Forests of Las Vueltas, Tucurrique, 600-750 meters, *Tonduz 13060*. Endemic. A tree of 7 meters; pinnae 1-jugate, the leaflets 2–3-jugate, elliptic or ovate-lanceolate, 5–15 cm. long, glabrous; flowers in racemes as much as 35 cm. long, the calyx 4 mm. long, the corolla 6–7 mm. long; legume curved almost into a circle, compressed, dehiscent, 12–15 mm. wide, constricted between the seeds. This species is the type and only species of Britton and Rose's genus *Punjuba*.

Pithecolobium Saman (Jacq.) Benth. *Cenícero. Samanea Saman* Merrill. Nicoya and Guanacaste, and probably in other parts of the Pacific slope. Yucatan to Brazil. A tall tree of 20 meters or more with very thick trunk, the crown depressed; pinnae 2–6-jugate, the leaflets 2–8-jugate, oblique, oblong or obovate, pubescent beneath; flowers flesh-colored, umbellate, the calyx 6 mm. long, the corolla 10–12 mm. long, sericeous; legume indehiscent, somewhat compressed but thick, 10–20 cm. long, 1–2 cm. wide. On the Pacific coast of Central America transverse sections of the huge

trunks often are used as wheels for ox carts. Cattle eat the fallen pods greedily. The wood is hard and heavy, fibrous, and dark brown or almost black. In some regions it is used for cabinetwork.

Pithecolobium sophorocarpum Benth. in Benth. & Hook. Gen. 1: 598. 1865. *Feuillea sophorocarpa* Kuntze, Rev. Gen. 189. 1891. *Cojoba sophorocarpa* Britt. & Rose, N. Amer. Fl. 23: 31. 1928. Forests of the central region; region of San Ramón. Endemic. Original locality unknown. A shrub or small tree; pinnae 1–5-jugate, the leaflets 5–12-jugate, oblong-lanceolate, 3–5 cm. long; flowers glabrous, capitate, the calyx 2 mm. long, the corolla 5 mm. long.

Pithecolobium Standleyi (Britt. & Rose) Standl., comb. nov. *Cojoba Standleyi* Britt. & Rose, N. Amer. Fl. 23: 32. 1928. La Tejona, near Tilarán, Guanacaste, *Standley & Valerio 45859*. Forests of Guanacaste, 600–700 meters. Endemic. An unarmed tree of 3–6 meters; pinnae 1-jugate, the leaflets 1–3-jugate, oblong or lanceolate, somewhat oblique, acute, 5–11 cm. long, almost glabrous; legume 10 cm. long, terete, red, constricted between the seeds. It is highly improbable that all the species of *Cojoba* described by Britton and Rose are valid, but I have not had sufficient material to make a decision as to their disposition.

Pithecolobium Valerioi (Britt. & Rose) Standl., comb. nov. *Cojoba Valerioi* Britt. & Rose, N. Amer. Fl. 23: 32. 1928. Quebrada Serena, near Tilarán, Guanacaste, *Standley & Valerio 46247*. Endemic. A shrub of 2 meters; pinnae 1-jugate, the leaflets 5, oblong or lanceolate, 4–10 cm. long, acuminate, glabrous; flowers capitate, the corolla 12 mm. long.

PROSOPIS L. Mesquite

A single species is known from Central America.

Prosopis chilensis (Molina) Stuntz. *P. juliflora* DC. Frequent in thickets along the seashores. Widely distributed in the warmer parts of America. A shrub or small tree, armed with spines; leaves bipinnate, with 2 pairs of pinnae, the leaflets numerous, oblong, 7–15 mm. long; flowers small, greenish, in slender spikes 5–10 cm. long; legume linear, somewhat compressed but thick, 10–20 cm. long, the seeds surrounded by a sweet pulp; anthers terminated by a gland. The wood is hard, fine-grained, and strong. The sweet pods are eaten by cattle, and they were formerly much used as food by American Indians. On the Central American coast the species is

known by the names Aromo and Carbón. The Mexican name is Mezquite.

SCHRANKIA Willd.

Two species are known from Central America.

Schrankia leptocarpa DC. Dry plains of Guanacaste. Extending to Paraguay. A perennial herb, prostrate or somewhat scandent, glabrous, armed with short, hooked prickles; pinnae 2–3-jugate, the leaflets 10–20-jugate, 6–10 mm. long; flowers purple-pink, capitate; legume subterete, 7–10 cm. long, 4 mm. broad, covered with slender setae.

STRYPHNODENDRON Mart.

A genus represented in Central America by a single species, the others being South American.

Stryphnodendron excelsum Harms, Repert. Sp. Nov. 19: 64. 1923. Río Hondo, *Pittier 16997*. Also in the region of El General. Endemic. A tall tree; leaves large, the pinnae 9–11-jugate, the leaflets 12–18-jugate, obovate, oblique, 1–2 cm. long, puberulent beneath, rounded at the apex; flowers small, in dense, axillary spikes; stamens 10, distinct, the anthers terminated by a gland; legume narrow, indehiscent.

II. CAESALPINIEAE

Reference: Britton & Rose, N. Amer. Flora 23: 201–349. 1930.

BAUHINIA L.

Shrubs or small trees, sometimes scandent or armed with spines; leaves simple and more or less bilobate, or composed of 2 leaflets; flowers large, white, pink, or yellow, racemose or corymbose, rarely solitary; stamens 10 or fewer, all or only 1 fertile; legume flat, elastically dehiscent.—Other species occur in Central America, and probably also in Costa Rica.

Bauhinia Beguinotii Cufodontis, Archivio Bot. 9: 192. 1933. Edge of forest between Waldeck and Río Barbilla, Atlantic coast, 40 meters, *Cufodontis 664*. An unarmed shrub 1 meter high; leaves petiolate, broadly ovate, entire, glabrous, rounded or subcordate at the base, up to 13 cm. long and 8.5 cm. wide, 7-nerved; racemes corymbiform; calyx glabrate; petals lanceolate, 2.5 cm. long, 5 mm. wide, acute, glabrous, white; fertile stamens 10. The species is known to the writer only from the original description.

Bauhinia Cookii Rose, N. Amer. Fl. 23: 205. 1930. Cuesta de La Vieja, near San Carlos, *Cook & Doyle 41*. Endemic. A tree; leaves rounded, 4–7 cm. long, tomentose beneath, the lobes acute; petals pale yellow, 1 cm. long; stamens 10.

Bauhinia manca Standl., sp. nov.—Frutex scandens cirrhifera inermis, ramis gracilibus ochraceis vel brunnescentibus, novellis plus minusve angulatis ferrugineo-strigillosis, internodiis valde elongatis; folia magna bifoliolata vel simplicia et fere ad basin partita subcoriacea, ad 12 cm. longe petiolata, segmentis semiovatis ad 28 cm. longis et 10 cm. latis longissime anguste acuminatis, basi late rotundatis, supra in sicco obscure viridibus lucidis, subtus brunnescentibus ubique densissime pilis minutissimis lucidis brunnescentibus sericeo-strigillosis; inflorescentia ignota.—Cataratas de San Ramón, *Brenes 20552* (type in Herb. Field Mus.). Probably conspecific are two collections from Barro Colorado Island, Canal Zone, Panama: *S. W. Frost 112* and *L. H. Bailey 278*, the latter taken from a large vine having stems 15 cm. broad, 5 cm. thick, and perforated with large holes. The plant is known only in a sterile state, but it appears to be rather frequent, and is so well marked in foliage that it seems desirable to give it a name for reference purposes.

Bauhinia Pauletia Pers. Between Bebedero and Paso Hondo, Guanacaste, 45–50 meters, *Brenes 12585*. Mexico to Puerto Rico and Venezuela. A shrub or small tree of 5 meters or less, armed with short, stout prickles; leaves broad, lobed for about one-third their length, the lobes rounded at the apex, the blades rounded or subcordate at the base, 6 cm. long or less, pubescent beneath or almost glabrous; flowers racemose, the calyx tube 1.5–2 cm. long; petals elongate-linear; perfect stamens 5; fruit linear, 25 cm. long or less, scarcely 1.5 cm. wide, pubescent or glabrate.

Bauhinia purpurea L. An ornamental tree or shrub, cultivated in many places. Native of Asia. Flowers large, purplish rose or white.

Bauhinia Standleyi Rose. *Schnella Standleyi* Britt. & Rose. Reported for Costa Rica, the locality not indicated, but probably in the Pacific coast. Panama. An unarmed shrub, the branches sometimes compressed, provided with tendrils; leaves broadly ovate, 3–5 cm. long, pubescent, the lobes obtuse; flowers white or greenish, the petals 10–14 mm. long; stamens 10; legume 6–7 cm. long, 2 cm.

wide. In the species of this group, the stems often are compressed and perforated with large holes, on account of which the plants often receive the name of Escalera de mono.

Bauhinia Storkii (Rose) Standl. Trop. Woods 34: 40. 1933. *Schnella Storkii* Rose, N. Amer. Fl. 23: 206. 1930. Río Changuinola, *Stork 140.* Known only from this region. A vine with tendrils; leaves rounded, 4–8 cm. long, coriaceous, shortly bilobate, the lobes rounded, pubescent beneath; petals 10–12 mm. long, villous.

Bauhinia ungulata L. *Casco de venado. B. inermis* Pers. Meseta Central to the Pacific coast, in forest or thickets. Mexico to Venezuela and Bolivia. A shrub or tree of 2–5 meters; leaves 6–12 cm. long, somewhat pubescent beneath, the lobes acute.

BROWNEA Jacq.

Brownea Ariza Benth. *Flor de Jesucristo.* Planted in the park at Limón, also about San José. Native of Colombia. A small tree, the leaves even-pinnate, the leaflets about 2 pairs, acuminate; flowers large, bright red, borne upon the branches in dense, head-like clusters subtended by large, deciduous bracts.

CAESALPINIA L.

Shrubs or trees, unarmed or provided with spines or prickles; leaves bipinnate; flowers large or small, racemose or paniculate; petals generally red or yellow; legume compressed or thick, dehiscent or indehiscent.—Other species are known from Central America.

Caesalpinia coriaria (Jacq.) Willd. *Nacascol.* Reported from Costa Rica, probably in the Pacific coast. Mexico to Venezuela. A tree of 10 meters or more, unarmed; pinnae 4–10-jugate, the leaflets numerous, oblong, 4–8 mm. long, glabrous; racemes short, the calyx 5 mm. long; legume oblong, straight or curved, 1–2 cm. wide, indehiscent. In some parts of Central America the hard wood of this tree is given the name Ebano. The pods are used for tanning and for dyeing black and blue.

Caesalpinia Crista L. Common on sea beaches, sometimes forming very dense and leafy thickets. A species of wide distribution in tropics of both hemispheres. A shrub of 1–2 meters, or a vine, armed with long, slender prickles; stipules large; pinnae 4–8-jugate, the leaflets 4–8-jugate, oblong or elliptic, 2.5–7 cm. long; flowers yellowish, the petals 1 cm. long; fruit oval, thick, 5–10 cm. long, 6 cm. wide, covered with long prickles, the seeds large, globose,

gray, 2–2.5 cm. in diameter. A characteristic species of Central American beaches. The handsome seeds, like marbles in appearance, often are found on beaches, to which they have been carried by ocean currents.

Caesalpinia eriostachys Benth. Bot. Voy. Sulph. 88. 1844. *Zahino. Poincianella eriostachys* Britt. & Rose, N. Amer. Fl. 23: 332. 1930. Nicoya, *Hinds*. Dry forests of the Pacific tierra caliente. Mexico to Panama. A tree of 5–10 meters or more; leaves deciduous, with numerous pinnae and leaflets, these rounded or oblong, 5–15 mm. long, pubescent with stellate hairs; flowers yellow, showy, the petals 1.5 cm. long; legume 10–12 cm. long, elastically dehiscent.

Caesalpinia pulcherrima (L.) Swartz. *Hojasén, Clavellina, Malinche. Poinciana pulcherrima* L. Cultivated commonly for ornament; naturalized and possibly native in some regions, such as the Pacific coast. A species of American origin, but almost if not quite unknown in a really native state. A glabrous shrub or small tree, the branches generally setose or prickly; leaves large, with numerous leaflets; flowers very large and showy, red or yellow; legume elastically dehiscent. One of the most common ornamental shrubs of Central America. In neighboring countries it is known by such names as Flor barbona and Guacamayo. An infusion of the leaves is employed as a purgative. For this species there are reported the Indian names Guaca-shorón and Guaca-ierón (Térraba).

Caesalpinia urophylla (Donn. Smith) Standl., comb. nov. *C. bonducella* var. *urophylla* Donn. Smith, Bot. Gaz. 57: 418. 1914. *Guilandina urophylla* Britt. & Rose, N. Amer. Fl. 23: 341. 1930. San Isidro near San Ramón, 1,300 meters, *Brenes 14501*. Collected also at San Pedro de San Ramón (*Brenes 20568, 20454*). Endemic. A large vine, climbing over trees, the branches and leaf rachis armed with recurved prickles; pinnae about 6 pairs, the leaflets 6–7 pairs, oblong-ovate, abruptly acuminate, 6–8.5 cm. long, glabrous or nearly so; flowers in long racemes, orange-yellow; fruit compressed, about 9 cm. long and 5.5 cm. wide, densely covered with stiff, spine-like prickles, 1-seeded.

CASSIA L.

Herbs, shrubs, or trees, usually unarmed; leaves pinnate, with 2 to many large or small leaflets; flowers small or large, almost always yellow; stamens 5–10, equal or unequal, the anthers erect; fruit very variable in form, dehiscent or indehiscent.—A vast genus, with many species in Central America. Britton and Rose divided

it into numerous small ones that are difficult of recognition, but if all are placed in a single genus, we have a group that can be recognized easily.

Cassia alata L. Golfo Dulce and plains of San Carlos. Mexico to Paraguay. A shrub of 2–4 meters; leaflets 6–12-jugate, oblong, 5–17 cm. long, rounded at the apex, puberulent; flowers large, yellow, in long, bracteate racemes; legume 10–15 cm. long, with 4 broad, longitudinal wings. Easy to recognize by the form of the fruit. In Panama this species is known by the name Laureño.

Cassia bacillaris L. *Candelillo. Chamaefistula Valerioi* Britt. & Rose, N. Amer. Fl. 23: 236. 1930 (Tilarán, Guanacaste, *Standley & Valerio 44266*). Common in thickets, Meseta Central to the coasts. Central America to Brazil. A shrub or tree of 2–6 meters; leaflets 4, ovate or elliptic, 8–12 cm. long, acute, somewhat oblique, almost glabrous; flowers large and very showy, yellow, paniculate; fruit subterete, 10–25 cm. long, indehiscent.

Cassia bicapsularis L. *Candelillo.* Common in the tierra caliente. Mexico to Paraguay. A shrub of 1–2 meters, almost glabrous; leaflets 3–5-jugate, oblong or rounded, 1–4 cm. long; flowers in short, axillary racemes, yellow; legume terete, 8–15 cm. long, finally dehiscent. Pittier reports the Térraba name of Shta-kuo-gró.

Cassia biflora L. *Abejón.* In thickets, Meseta Central to the Pacific coast. Mexico to Venezuela. A slender shrub of 1–2 meters, pubescent or almost glabrous; leaflets 4–10-jugate, oblong to obovate, 1–3 cm. long, obtuse; peduncles axillary, 1–3-flowered, the flowers large, yellow; legume linear, flat, 6–15 cm. long, 5 mm. wide. A very ornamental plant, like many other species, because of its abundance of large, yellow flowers.

Cassia brevipes DC. *Sipia. Chamaecrista brevipes* Greene. Paraíso; savannas of the Pacific tierra caliente. Ranging to the Guianas. A shrub 1.5 meters or less in height; leaflets 2-jugate, oblong, glabrous or puberulent, obtuse or acute, coriaceous; flowers axillary, solitary, yellow; legume flat, elastically dehiscent, 2 cm. long, pilose. Pittier states that the plant is used as a vermifuge.

Cassia caudata Standl. *Chamaefistula caudata* Britt. & Rose. Reported from the region of El General, collected by Skutch; determined by C. V. Morton. Panama. Leaflets 2 pairs, obovate or oblong, 13–21 cm. long, obtuse or rounded at the base, abruptly

contracted into a caudate tip 1.5–3 cm. long, glabrous; inflorescence few-flowered, the bracts linear-subulate; petals 2 cm. long.

Cassia emarginata L. Plains of Turrúcares, Guanacaste, and probably in other parts of the Pacific tierra caliente. Mexico to Venezuela. A small tree; leaflets 2–5-jugate, oval, 2–10 cm. long, rounded or obtuse at the apex, densely pilose beneath; flowers yellow, in short racemes; legume linear, flat, indehiscent, 15–35 cm. long, 8–12 mm. wide.

Cassia grandis L. f. *Carao, Sándalo.* Common in the Pacific coast, also in the Meseta Central (planted?), in and Limón. Mexico to the Guianas. A tree of 10 meters or more, the crown broad and depressed; leaflets 8–20-jugate, oblong, obtuse, 3–5 cm. long, pubescent; flowers large, pink, racemose; fruit terete, hard, indehiscent, 45–60 cm. long, 3.5 cm. thick. The wood is somewhat brownish yellow and fibrous; it has few uses. Pittier states that a decoction of the pulp in water or milk is used as a laxative and also as a depurative in certain affections of the skin. When covered with its masses of pale pink blossoms, this tree is an exceptionally beautiful one, the color effect being almost exactly that of an apple tree in bloom.

Cassia guatemalensis Donn. Smith. *Peiranisia guatemalensis* Britt. & Rose. Reported for Costa Rica, without indication of the locality. Also in Guatemala. A shrub; leaflets 5–7-jugate, oblong, 1.5–3 cm. long, sparsely pubescent beneath, retuse; flowers large, yellow, in axillary racemes; legume linear, flat, 5 cm. long, 6–8 mm. wide.

Cassia hispidula Vahl. *Nauapate.* Dry, open places of the Pacific tierra caliente. Mexico to Brazil. A prostrate herb, viscid-pilose; leaflets 2-jugate, rounded or obovate, 1–2 cm. long, glabrous; flowers large, yellow; legume elastically dehiscent, oblong, 4–5 cm. long, pilose with long, viscid hairs.

Cassia laevigata Willd. *Candelillo, Vainilla.* Thickets of the Meseta Central and Cantón de Dota. A species of wide distribution in tropics of both hemispheres. A shrub or small tree of 1–4 meters, glabrous; leaflets 3–4-jugate, ovate or lanceolate, acuminate, 3–8 cm. long; racemes short, the flowers yellow; fruit subterete, indehiscent, 6–9 cm. long, 1 cm. thick.

Cassia leiophylla Vogel. *Vainilla.* Common in the tierra caliente; region of San Ramón, at 1,050 meters. Mexico to Brazil.

An erect herb a meter high; leaflets 3-jugate, obovate, obtuse, 2–6 cm. long, pubescent or almost glabrous; flowers large, yellow, axillary; legume narrowly linear, flat, 10–12 cm. long, 3–6 mm. wide.

Cassia leptocarpa Benth. var. **hirsuta** Benth. Meseta Central, San Ramón, and probably elsewhere. A species of wide distribution. Herbaceous or suffrutescent, 1 meter high; leaflets 4–7-jugate, ovate or lanceolate, acuminate, densely pilose; flowers large, yellow, in axillary racemes; legume linear, dehiscent, 7–30 cm. long, 3–5 mm. wide, pilose. The typical form of the species is almost glabrous.

Cassia moschata HBK. Reported for Costa Rica, the locality not indicated. Ranging to the Guianas. A tree of 10–15 meters; leaflets 10–18-jugate, oblong, obtuse, 4–5 cm. long, pubescent; flowers large, yellow or orange, in elongate racemes; fruit cylindric, 30–60 cm. long, 2 cm. thick, indehiscent. The pulp of the fruit has the odor of musk.

Cassia nicaraguensis Benth. Dry thickets of Guanacaste. Mexico to Panama. A shrub of 1.5–3 meters, glabrous; leaflets 5–20-jugate, oblong or lanceolate, 4–8 cm. long, acute or obtuse; flowers large, yellow, in axillary racemes; legume linear, 7–12 cm. long, 1–1.5 cm. wide, flat, lustrous, dehiscent.

Cassia nicoyana (Britton) Standl., comb. nov. *Chamaecrista nicoyana* Britton, N. Amer. Fl. 23: 292. 1930. Near Nicoya, *Tonduz 13556*. Endemic. A prostrate or ascending herb, the branches pilose; leaflets 10–22-jugate, linear-lanceolate, acute, 10–12 mm. long; flowers axillary; legume elastically dehiscent, flat, 4–5 cm. long, 5–6 mm. wide, pilose.

Cassia occidentalis L. *Pico de pájaro, Pisabed* (Limón). Common in waste ground of the tierra caliente; ascending to at least 1,050 meters. Pantropic in distribution. Herbaceous, about 1 meter high; leaflets 4–6-jugate, ovate, 3–7 cm. long, acuminate; flowers yellow, in short, axillary racemes; legume linear, flat, finally dehiscent, 6–12 cm. long, 6–9 mm. wide. In some parts of Central America this species is known by the name Frijolillo. On the Atlantic coast of Costa Rica the roasted seeds are sometimes employed as a substitute for coffee. The root is employed as a local remedy for kidney diseases.

Cassia pallidior Rose. Vicinity of San José. Also in Panama. An almost glabrous shrub; leaflets as many as 12 pairs, oblong or

rounded, 1.5–3.5 cm. long, pale beneath; peduncles 2-flowered, axillary, the flowers yellow, large; legume linear, 12–15 cm. long, 5–6 mm. wide.

Cassia patellaria DC. *Chamaecrista patellaria* Greene. Meseta Central; region of San Ramón, at 1,050 meters. Widely distributed in tropical America. An erect herb; leaflets 10–25-jugate, linear, pubescent, mucronate, 8–15 mm. long; flowers axillary, fasciculate; legume linear, flat, elastically dehiscent, 2.5–3.5 cm. long, 4 mm. wide, pilose.

Cassia reticulata Willd. *Saragundín, Saragundí.* Common in the tierra caliente, sometimes growing along streams. Guatemala to Brazil. A shrub or tree of 3–6 meters; leaflets 8–12-jugate, oblong, obtuse, 7–10 cm. long, pubescent beneath; flowers large, in long, dense racemes, the sepals and large bracts orange-colored, the petals pale, bright yellow; legume flat, 12–18 cm. long, 1.5–2 cm. wide, lustrous. A very showy plant because of its abundance of large and brightly colored inflorescences. The leaflets fold together at nightfall, opening again in the morning. Pittier states that an infusion of the leaves is employed as a remedy for ringworm. The plant is reported to have purgative and even poisonous properties. It is sometimes planted for ornament in the Meseta Central.

Cassia rotundifolia Pers. Meseta Central to the Pacific coast. Mexico to Brazil. A prostrate perennial, pilose or almost glabrous; leaflets 1-jugate, rounded or obovate, 1–3 cm. long, rounded at the apex; flowers axillary, pedicellate, yellow; legume elastically dehiscent, flat, 1.5–3 cm. long, 4 mm. wide, puberulent.

Cassia Rowleana (Britt. & Rose) Standl., comb. nov. *Chamaefistula Rowleana* Britt. & Rose, N. Amer. Fl. 23: 234. 1930. Bananito, *W. E. & H. E. Rowlee 285.* Endemic. A shrub or small tree; leaflets 2-jugate, ovate or elliptic, 7–18 cm. long, acuminate, pale and puberulent beneath; flowers large, yellow, in terminal panicles; petals 2–2.5 cm. long; fruit terete, 10–12 cm. long, indehiscent.

Cassia spectabilis DC. *Candelillo.* Meseta Central to the Pacific coast. Mexico to Venezuela, sometimes planted as an ornamental tree. A tree of 5–12 meters; leaflets 6–15-jugate, lanceolate, acuminate, somewhat pubescent beneath; flowers large, yellow, paniculate; fruit terete, scarcely dehiscent, 15–30 cm. long, 1 cm. thick.

Cassia Standleyi (Britt. & Rose) Standl., comb. nov. *Chamaefistula Standleyi* Britt. & Rose, N. Amer. Fl. 23: 238. 1930. Near San José, *Standley 41236*. Region of San Ramón. Endemic. A tree of 3–6 meters; leaflets 4, ovate, acute, 10–13 cm. long, pilose beneath; flowers large, yellow, paniculate; fruit terete, indehiscent. Britton and Rose described a large number of species in their genus *Chamaefistula*, but I believe that few of them are of any systematic importance, and the present species probably will be reduced to synonymy.

Cassia stenocarpa Vogel. *Chamaecrista stenocarpa* Standl. Meseta Central to the Atlantic coast; region of San Ramón. Mexico to Brazil. A sparsely branched herb, the branches pilose; leaflets 10–25-jugate, linear, mucronate, almost glabrous, 6–18 mm. long; flowers axillary, solitary or fasciculate, golden yellow, the petals only 8 mm. long; legume flat, elastically dehiscent, 2.5–5 cm. long, 4 mm. wide, pilose.

Cassia stenocarpoides (Britton) Standl., comb. nov. *Dormilona. Chamaecrista stenocarpoides* Britton, N. Amer. Fl. 23: 293. 1930. San Sebastián, near San José, *Standley 32701*. Meseta Central. Also in Guatemala. An erect, branched herb, the branches pilose; leaflets 10–20-jugate, linear, mucronate, glabrous or somewhat pubescent, 7–12 mm. long; flowers solitary, the petals 1 cm. long; legume flat, elastically dehiscent, 3–5.5 cm. long, 4 mm. wide, pubescent.

Cassia Tagera L. Meseta Central to the Pacific coast, in open, grassy places. Mexico to Brazil. A prostrate herb; leaflets 2–3-jugate, obovate, obtuse, glabrous, 5–10 mm. long; pedicels slender, axillary, the flowers yellow; legume dehiscent, flat, oblong, as much as 12 mm. long and 3–4 mm. wide, with 1–4 seeds.

Cassia Tonduzii Standl. Contr. U. S. Nat. Herb. 20: 215. 1919. *Peiranisia Tonduzii* Britt. & Rose, N. Amer. Fl. 23: 265. 1930. Río Tilirí, *Tonduz 7213*. Region of San Ramón. Also in Chiapas. A shrub or tree; leaflets 4–5-jugate, lanceolate or oblong, acuminate, 2–9 cm. long, somewhat pubescent beneath; flowers large, yellow, paniculate; legume flat, dehiscent, 16–18 cm. long, 5–6 mm. wide.

Cassia Tora L. In waste ground, Meseta Central to the coasts. Pantropic in distribution. An herb a meter high, glabrous; leaflets 2–4-jugate, obovate, 1.5–5 cm. long, rounded at the apex; flowers

axillary, yellow; legume linear, 4-angulate, as much as 20 cm. long, 3–5 mm. wide, straight or somewhat curved.

Cassia verbenensis (Britton) Standl., comb. nov. *Peiranisia verbenensis* Britton, N. Amer. Fl. 23: 266. 1930. La Verbena, near San José, *Standley 32215*. Endemic. A tree of 6–9 meters; leaflets 3–4-jugate, ovate or elliptic, acute or obtuse, 1.5–5 cm. long, pubescent beneath; peduncles axillary; legume linear, flat, 18 cm. long, 8 mm. wide.

Cassia Williamsii (Britt. & Rose) Standl., comb. nov. *Peiranisia Williamsii* Britt. & Rose, N. Amer. Fl. 23: 265. 1930. Reported for Costa Rica, the locality not indicated. Also in Panama. A shrub of 3 meters; leaflets 40–60-jugate, linear, 9–12 mm. long, obtuse, glabrous; flowers axillary, yellow, large; legume flat, dehiscent, 12–14 cm. long, 4 mm. wide.

CYNOMETRA L.

Another Central American species grows in Guatemala and Honduras.

Cynometra hemitomophylla (Donn. Smith) Britt. & Rose, N. Amer. Fl. 23: 220. 1930. *Cativo. Copaifera hemitomophylla* Donn. Smith, Bot. Gaz. 27: 332. 1899. Santo Domingo de Golfo Dulce, *Tonduz 9972*. Also in forests of the Atlantic coast. Endemic. A tall tree; leaflets 2, oblong-lanceolate, 10–15 cm. long, 3–5 cm. wide, short-acuminate, glabrous; flowers axillary, fasciculate; legume rounded, coriaceous, somewhat compressed, 3–4.5 cm. long.

DELONIX Raf. Poinciana

Delonix regia (Bojer) Raf. Planted for ornament, especially in parks. Native of Madagascar. A medium-sized tree with very large, deciduous leaves; showy because of its large panicles of fiery red flowers; noteworthy also for the very large pods, 40–60 cm. long. One of the showiest trees of the tropics, known in Central America by such names as Arbol de fuego and Guacamayo.

DIALIUM L.

In North America a single species is known.

Dialium guianense (Aubl.) Steud. *D. divaricatum* Vahl. Common in forests of the Atlantic coast. Guatemala to Brazil. A tree of 10–30 meters, glabrous; leaves pinnate, the leaflets 5–7-

jugate, opposite or alternate, ovate or lanceolate, acuminate, 3–8 cm. long; flowers small, paniculate, the petals 1 or 2 and minute or none; stamens 2 or 3; fruit subglobose, indehiscent, 1.5–2.5 cm. long, 1-seeded. In Panama the tree is known by the name Tamarindo. The wood is dark reddish brown, hard, heavy, strong, and medium fine-grained. It is utilized for various kinds of construction. The fruits are much eaten by peccaries and other animals.

HAEMATOXYLON L.

One other species, *H. campechianum* L., which supplies the logwood or palo de tinta of commerce, is known from northern Central America.

Haematoxylon Brasiletto Karst. *H. boreale* Wats. Guanacaste, in the region of Liberia, collected only by Brenes. Extending to Mexico, and on the northern coast of Colombia. A shrub or small tree, armed with short, stout, straight spines; leaves pinnate, the leaflets mostly 3 pairs, obovate-cuneate, 2.5 cm. long or less, often retuse at the apex, finely many-nerved, glabrous; flowers bright yellow, scarcely 1 cm. long, in short racemes, on long, slender pedicels; fruit strongly compressed and flat, linear or oblong, thin, conspicuously veined, 2–6 cm. long, 8–10 mm. wide, dehiscent lengthwise along the middle of the valves. The wood of this plant yields a dye like that of logwood, and it is or has been employed in commerce for the same purpose as *H. campechianum*.

HYMENAEA L.

A single species is known from North America.

Hymenaea Courbaril L. *Guapinol, Cuapinol.* Common in dry forests of the Pacific slope. Mexico to the Guianas. A tree of 10–20 meters or more, the bark almost smooth, the crown broad and sometimes depressed; leaflets 2, coriaceous, oblong or ovate, acute, 4–9 cm. long, glabrous; flowers large, whitish or purple, in small, terminal panicles; stamens white, elongate; fruit woody, indehiscent, oblong, dark brown, somewhat compressed but thick, 5–10 cm. long, with few seeds. The seeds are surrounded by a dry, white powder that is sweet, and was eaten by the Indians. The wood is dark brown or orange, hard and heavy, strong, and moderately durable. It is employed for various kinds of construction. The bark, separated from the trunk, is sometimes employed for making canoes. A yellow or reddish gum that exudes from the

trunk is known in commerce as South American copal, and employed for varnish and as incense in churches. In Panama the tree is given the name Algarrobo, a word of Arabic origin, applied in Spain to *Ceratonia siliqua*, or St. John's bread. The Térraba name is Temá.

MORA Benth.

A single species has been reported from Central America.

Mora megistosperma (Pittier) Britt. & Rose. *Alcornoque. Dimorphandra megistosperma* Pittier. Golfo Dulce. Also in Panama and Colombia. A tall tree of 15–45 meters; leaves pinnate, the leaflets 2-jugate, oblong, 10–18 cm. long; flowers small, in dense spikes; fruit about 25 cm. long and 13 cm. wide. The seeds, somewhat compressed, 18 cm. long and 12 cm. broad, are perhaps the largest produced by any dicotyledonous plant. The wood is hard, reddish, and durable. The tree grows usually in land that is inundated for part of the year.

PARKINSONIA L.

Parkinsonia aculeata L. Sometimes planted for ornament, and probably also naturalized, as in other regions of Central America. An American plant, but not native in Central America. A shrub or small tree, very spiny; leaves bipinnate, the pinnae 1–2-jugate, the leaflets 10–25-jugate, often deciduous, the rachis compressed and winged; flowers sulphur-yellow, in short racemes; legume linear, torulose, striate, dehiscent, 5–15 cm. long, constricted between the seeds. In Salvador this plant is known by the name Sulfato.

PRIORIA Griseb.

The genus consists of a single species.

Prioria copaifera Griseb. *Camíbar, Cativo.* Forests of the Golfo de Osa, and frequent in the Atlantic coast. Nicaragua to Colombia, and in Jamaica. A tree of 12–30 meters, the trunk sometimes 1.5 meters in diameter; leaflets 2-jugate, lanceolate or elliptic, 10–16 cm. long, acute, glabrous; flowers small, without petals, in paniculate racemes; fruit flat, rounded, finally dehiscent, 6–10 cm. long, brown, 1-seeded. The wood is brownish or whitish, fine- or medium-grained, easy to work, and moderately hard and strong. It is little used. This tree furnishes the resin known in commerce as Copaiba balsam (bálsamo de copaiba), which has various uses in medicine and pharmacy. The Guatuso name is Túriman.

SCHIZOLOBIUM Vog.

A single species occurs in Central America.

Schizolobium parahybum (Vell.) Blake. Forests of the Pacific tierra caliente, and probably in the Atlantic coast. Mexico to Brazil. A tall tree, usually 15 meters high or more, the trunk almost smooth, the crown composed of few branches; leaves very large, often a meter long, the leaflets very numerous, oblong, 2 cm. long, rounded at the apex; flowers large and showy, in terminal panicles; legume spatulate, flat, dehiscent, 8–12 cm. long, 3–5 cm. wide, 1-seeded. The wood is almost white, with brown stripes, very soft and light in weight, or sometimes moderately hard and strong. It is not used, but is believed to be satisfactory for paper making. The tree is beautiful when covered with its great panicles of golden flowers. The young tree usually has a tall, simple trunk, terminated by a cluster of huge, fern-like leaves, and is strangely suggestive of a tall tree fern.

SWARTZIA Schreb.

Other species occur in Central America, and are to be found, probably, in Costa Rica.

Swartzia simplex (Swartz) Spreng. *S. ochnacea* DC.; *S. simplex* var. *continentalis* Urban; *Tounatea costaricensis* Britton, N. Amer. Fl. 23: 345. 1930 (Tilarán, Guanacaste, *Standley & Valerio 44407*). Common in forests of the tierra caliente; region of San Ramón. Mexico to Panama and West Indies. A shrub or small tree as much as 7 meters high, glabrous or somewhat pubescent; leaves 1-foliolate, the leaflet oblong, acuminate, 8–15 cm. long, coriaceous; flowers in short racemes, with a single yellow petal; stamens numerous; fruit terete, finally dehiscent, yellow or reddish when ripe, usually 1-seeded. Although several species of this group of the genus have been described or reported from Central America, probably all are mere forms of this species.

TAMARINDUS L. Tamarind

Tamarindus indica L. *Tamarindo.* Cultivated in the tierra caliente, more commonly on the Pacific slope, and sometimes naturalized. Native of the East Indies. A medium-sized tree; leaves pinnate, the numerous leaflets oblong, obtuse, 1–2 cm. long; flowers large, yellow striped with red, in paniculate racemes; fruit 5–15 cm. long, 2 cm. wide, brown, indehiscent, 4–7-seeded. The pulp surrounding the seeds is somewhat acid, and has a most agreeable flavor. It is employed commonly for preparing refreshing iced drinks.

III. PAPILIONATAE

ABRUS L.

A single species occurs in Central America.

Abrus precatorius L. Thickets of the Atlantic tierra caliente. Almost pantropic in distribution. A slender, woody vine; leaves pinnate, the leaflets 8–15-jugate, oblong; 8–15 mm. long, no terminal leaflet present; flowers small, white or pink, clustered in the leaf axils; legume compressed, oblong, 2–3.5 cm. long, 1 cm. wide; seeds scarlet, lustrous, with a black spot. The leaves and root have the flavor of licorice. The seeds are believed to be poisonous. The leaflets fold together during the night and unfold in the morning. The handsome seeds are employed for making necklaces, bracelets, and other similar articles. On account of their uniform size and weight, the seeds formerly were employed in the East Indies as weights in appraising jewels.

AESCHYNOMENE L.

Herbs or small shrubs; leaves pinnate, with few or numerous small leaflets; flowers small, in racemes or axillary fascicles, yellow or reddish; fruit stipitate, compressed, the margins constricted between the few or numerous joints, which are 1-seeded and indehiscent.—Other species occur in Central America.

Aeschynomene americana L. Common in moist places, Meseta Central to the coasts. A species of wide distribution. An erect, branched herb, viscid-pubescent; stipules attached above their base; leaflets numerous, linear, acute; flowers dark yellow or somewhat reddish; fruit with numerous articulations. One of the most common weedy plants of the Atlantic tierra caliente of Central America.

Aeschynomene biflora (Mill.) Fawc. & Rendle. *A. brasiliana* DC. Dry places of the Pacific coast. Mexico to Brazil. A prostrate herb, viscid-pilose; leaflets obovate or oblong, 5–8-jugate, 8–10 mm. long; stipules attached by their base; pods 2–3-articulate, glabrous or pubescent.

Aeschynomene falcata DC. *Pegapega*. Dry places, Meseta Central to the Pacific coast. Mexico to Brazil. A usually prostrate herb; leaflets 4–9-jugate, obovate-oblong; stipules attached by their base; pods with 4–8 puberulent articulations.

Aeschynomene hystrix Poir. Reported from Térraba. Mexico to Brazil. A prostrate or procumbent herb, viscid-pilose; leaflets 8–15-jugate, oblong; stipules attached by the base; pods short-stipitate, the 2 articulations almost glabrous.

Aeschynomene paniculata Willd. Reported from Buenos Aires. Extending south to Brazil. An erect herb, the stems glabrous; stipules attached by the base; leaflets 30–50-jugate, linear-oblong, obtuse; flowers in terminal racemes; pods with 4–6 glabrous articulations.

Aeschynomene sensitiva Swartz. *Frijolillo, Conene.* Swampy places of the tierra caliente. A species of wide distribution in America and Africa. An erect herb a meter high, the stems glabrous or somewhat pilose; stipules attached above the base; leaflets 15–20-jugate, oblong, obtuse; fruit with few thick and almost glabrous articulations.

ANDIRA Lam.

Two species occur in Central America, the other in Panama.

Andira inermis (Swartz) HBK. *Almendro, Carne asada* (Guanacaste). Common in forests of the tierra caliente. Mexico to Brazil, and in Africa. An unarmed tree of 9–15 meters or more with dense crown; leaves pinnate, the leaflets opposite, 7–13-jugate, acuminate, glabrous; flowers purple or violet, in large, terminal panicles, 1–1.5 cm. long; fruit subglobose, woody, 2–4 cm. long, indehiscent, 1-seeded. The bark has a disagreeable odor; it is employed as a vermifuge, purgative, and narcotic, but its use is dangerous because the tree possesses poisonous properties. It is said that the seeds contain a poisonous alkaloid. The wood is heavy, strong, and durable, variable in color from yellowish to almost black. The tree is a handsome one when loaded with its showy flowers. It may be recognized easily by the form and size of its distinctive fruit.

ARACHIS L. Peanut

All species of the genus are natives of South America, chiefly of Brazil.

Arachis hypogaea L. *Maní, Cacahuate.* A plant of Brazilian origin, little cultivated in Costa Rica, although it yields well here. There are imported small quantities of the oily seeds which are sold after being roasted. One of the common sights of the port of Limón is the peanut venders with their long and wailing "Maní-í-í-í." In the United States enormous quantities of the roasted nuts are

consumed, and from the seeds are extracted large quantities of oil that is employed for many purposes. The plant is curious because of its habit of growth, the flowers opening above ground, their peduncles then elongating and pushing into the soil, beneath which the seeds are matured. The name Cacahuate is of Nahuatl origin, signifying "ground cacao."

BARBIERIA DC.

A single species occurs in Central America.

Barbieria pinnata (Pers.) Baill. *B. polyphylla* DC. Río Platanar, collected by Tonduz; reported from El General. A species of wide distribution in tropical America. A shrub of 1–6 meters, erect or somewhat scandent; leaves pinnate, the leaflets numerous, oblong, rounded at the apex, pale and sericeous beneath; flowers red, 5–6 cm. long, in axillary racemes; legume linear, pilose, dehiscent.

BENTHAMANTHA Alefeld

Other species are known from Central America.

Benthamantha mollis (HBK.) Alefeld. *Cracca mollis* Benth. & Oerst. In thickets, Meseta Central to the Pacific coast, at 1,800 meters or less. Mexico to Ecuador. A slender shrub 1 meter or less in height, the branches pilose; leaves pinnate, the leaflets 7–13, elliptic, 1–4 cm. long, rounded and mucronate at the apex, sericeous beneath; flowers in short, axillary racemes, greenish and reddish, the corolla 9 mm. long; legume linear, 6–7 cm. long, 3 mm. wide, compressed, puberulent or almost glabrous, impressed between the seeds.

Benthamantha mollis var. **micrantha** (Micheli) Standl., var. nov. *Cracca micrantha* Micheli, Bull. Soc. Bot. Belg. 30, pt. 1: 286. 1891. *Brittonamra caribaea* f. *micrantha* Kuntze, Rev. Gen. 165. 1891. *Benthamantha micrantha* Rose, Contr. U. S. Nat. Herb. 10: 99. 1906. Curridabat, near San José, *Pittier 3033*. Meseta Central. Endemic (?). Hairs of the branches appressed; flowers smaller, only 6 mm. long. It is probable that the name *micrantha* is a direct synonym of *B. mollis*, and not worthy of varietal designation.

CAJANUS DC.

Cajanus bicolor DC. *Guandú, Guandul, Timbolillo, Quimbolillo, Frijol de palo, Petipoá. C. indicus* Spreng.; *C. Cajan* Millsp. Cultivated for its edible seeds, and planted for shade in new plantations of

coffee and cacao, also naturalized in many localities, especially in the coasts. Native of tropical Asia. An erect herb or shrub of 1–2 meters; leaflets 3, oblong or elliptic, acute, finely pubescent beneath; flowers large, yellow and red, in axillary, pedunculate racemes; legume 5–8 cm. long, 1 cm. wide, pubescent, the valves impressed between the whitish or gray seeds. The seeds are good to eat, cooked like beans, and are much used in the coast regions.

CALOPOGONIUM Desv.

Scandent herbs, sometimes suffrutescent, pubescent; leaflets 3; flowers small, purple or violet, in short or elongate racemes; legume linear, compressed, dehiscent.

Calopogonium brachycarpum Benth. Common in waste or cultivated ground of the Atlantic tierra caliente; region of San Ramón, at 1,000 meters. Mexico to northern South America. A small vine, pilose with brown hairs; leaves ovate or almost rounded, pilose, obtuse or rounded at the apex; racemes shorter than the leaves, few-flowered; legume short, 4 mm. wide, villous.

Calopogonium coeruleum Benth. In thickets, Meseta Central to the coasts. Mexico to Brazil. A large, somewhat woody vine; leaflets broad, softly pubescent beneath; flowers violet, the racemes much longer than the leaves, many-flowered; legume 5–8 mm. wide, softly pubescent.

Calopogonium ferrugineum Piper, Proc. Biol. Soc. Wash. 34: 42. 1921. Las Vueltas, Tucurrique, *Tonduz 12889*. Endemic. Leaflets broadly ovate, 7–8 cm. long, densely pubescent; racemes 20–30 cm. long, many-flowered, the flowers 7–8 mm. long, purple; legume 9 cm. long, 1.5 cm. wide. I have seen no specimens of this species.

Calopogonium galactoides (HBK.) Benth. *Frijolillo*. Meseta Central to the Atlantic coast; region of San Ramón. Mexico to Venezuela. A small vine, herbaceous, densely pubescent; leaflets small, oblong, obtuse or acute, densely sericeous; racemes short and few-flowered, the flowers white; legume linear, 3 mm. wide.

Calopogonium phaeophlebium Donn. Smith. Río Torres, near San Francisco de Guadalupe. Also in Guatemala. An herb; leaflets elliptic-oblong, 6–8 cm. long, obtuse, sericeous; racemes longer than the leaves, the flowers 7 mm. long; legume strigose, 5 cm. long, 3 mm. wide.

CANAVALIA Adans.

Reference: C. V. Piper, Contr. U. S. Nat. Herb. 20: 555. 1925.

Herbaceous or suffrutescent plants, usually scandent; leaflets 3; flowers white, pink, or purple, in axillary racemes; calyx bilobate; legume oblong or linear, compressed, dehiscent, the valves costate near the sutures.—Other species are known from Central America.

Canavalia bicarinata Standl. *Wenderothia bicarinata* Piper. Nicoya. Also in Panama. A herbaceous vine; leaflets ovate, 3–5 cm. long, acuminate, puberulent beneath; corolla purple, 3 cm. long; legume 10–14 cm. long, 1.5–2 cm. wide, the valves with 4 longitudinal crests.

Canavalia maritima (Aubl.) Thouars. *Frijol de playa.* A characteristic species of sea beaches; Cocos Island. Mexico to Brazil. A prostrate herb, the tough stems sometimes 10 meters or more in length; leaflets large, very thick, glabrous, usually retuse; flowers pink; legume 10 cm. long, 2.5 cm. wide, the valves with a single crest. This and *Ipomoea Pes-caprae*, alike in habit and general appearance, are the most abundant plants on Central American seacoasts.

Canavalia panamensis Piper. Thickets of the Atlantic tierra caliente. Also in Panama. A herbaceous vine; leaflets elliptic or ovate, acuminate, almost glabrous; flowers large, purple; legume 12–14 cm. long, 2 cm. wide, the valves with 3 crests.

Canavalia villosa Benth. *Gallinilla, Cuchillo, Ojo de venado*(?). *Wenderothia villosa* Piper. Common in thickets of the central region, at 1,000–1,800 meters. Mexico to Panama. A herbaceous or somewhat woody vine; leaflets elliptic or ovate, acuminate, tomentose to almost glabrous beneath; flowers purple, 3 cm. long; legume 10–20 cm. long, 1–1.5 cm. wide, the valves with 3 crests.

CENTROSEMA DC.

Scandent herbs; leaflets 3, rarely 1; flowers large, the peduncles with 1 or more flowers; standard petal much larger than the other petals; legume linear, dehiscent.

Centrosema angustifolium (HBK.) Benth. Boruca and Buenos Aires. Guatemala and British Honduras to Brazil. A slender, glabrous herb; leaflets linear-oblong, thick; upper teeth of the calyx much shorter than the tube; corolla bright purple. A characteristic plant of savannas.

Centrosema pascuorum Mart. Reported from Costa Rica by Hemsley, without indication of the locality. Ranging to Brazil. Plants slender, glabrous or somewhat pubescent; leaflets oblong or linear, thick; calyx teeth longer than the tube.

Centrosema Plumierii (Turp.) Benth. *Gallinita.* A common plant of the tierra caliente, also in the Meseta Central, at 1,100 meters or less. Mexico to Brazil. A large vine, blackish when dried; leaflets elliptic or ovate, large, almost glabrous; flowers 4 cm. long, yellowish white, dark purple in the center; legume very long, 1 cm. wide.

Centrosema pubescens Benth. *Gallinita.* Common in thickets, Meseta Central to the Pacific coast. A species of wide distribution in tropical America. A small vine; leaflets elliptic or ovate, 4–10 cm. long, acuminate, pubescent; flowers 3–4 cm. long, purple; bracts sericeous with long, soft hairs.

Centrosema sagittatum (Humb. & Bonpl.) Brandegee. *Gallinitas.* Mountains of Guanacaste, and in the Meseta Central. Mexico to Colombia. A small vine; leaflet 1, hastate, the petiole winged. Easily distinguished from all other species by the solitary leaflet and winged petiole.

Centrosema virginianum (L.) Benth. *Gallinita.* Thickets of the mountains of Guanacaste. Widely distributed in tropical and temperate America. A large or small vine; leaflets oblong or ovate, pubescent or almost glabrous; flowers purple, 2 cm. long; bracts puberulent.

CHAETOCALYX DC.

A single species occurs in Central America.

Chaetocalyx latisiliqua (Desv.) Benth. Moist thickets of the tierra caliente. Extending to Peru. A herbaceous vine, pubescent or almost glabrous; leaflets 5, elliptic, rounded at the apex, pale beneath; flowers yellow, in short, axillary racemes, 2 cm. long; legume flat, linear, 6 cm. long, finely pubescent, composed of numerous 4-sided articulations.

CICER L. Chick pea

Cicer arietinum L. *Garbanzo.* Cultivated occasionally for its large, edible seeds. Native of Europe. One of the most important food plants of Spain, occupying there the role of the bean (*frijol*)

in Central America. It is an important food plant also in Mexico, but it is of minor importance in Central America.

CLITORIA L.

Herbs or shrubs, erect or scandent; leaflets 1–9; peduncles axillary, with 1 or more large or small flowers; calyx tubular; standard much larger than the other petals; legume linear, dehiscent, the valves naked or costate.—Other species are known from Central America.

Clitoria arborescens Ait. Thickets of El Coyolar. Also in Panama and Trinidad. A shrub of 1–5 meters, erect or scandent; leaflets large, acuminate, almost glabrous; flowers pink, 7 cm. long. This shrub, so common in certain parts of Panama, is one of the most beautiful and lovely plants of Central America, because of its large flowers, of an exquisite shade of pink.

Clitoria glycinoides DC. Boruca. Ranging to Brazil. A scandent herb, pilose; leaflets 3, ovate or oblong; corolla purple, 2.5 cm. long; legume 3.5–5 cm. long.

Clitoria javitensis (HBK.) Benth. Boca Culebra. Ranging to Brazil. A woody vine; leaflets 3, ovate or elliptic, large, acuminate, glabrous or somewhat pubescent; flowers very large, about 7 cm. long.

Clitoria Ternatea L. Cultivated for ornament, and probably naturalized in some localities. Native of the Old World tropics. A herbaceous vine, somewhat pubescent; leaflets 5–9; flowers deep blue, 4.5 cm. long. Because of its intensely blue flowers, the plant is exceptionally attractive. In Salvador it is known by the name Zapatillo de la reina.

COLOGANIA Kunth

Scandent or suberect herbs; leaflets 1 or 3; flowers medium-sized, axillary, fasciculate or racemose; calyx tubular; legume linear, compressed, dehiscent.—Other Central American species occur in Guatemala.

Cologania procumbens Kunth. Cañas Gordas; Dulce Nombre, Prov. Cartago; in pastures or savannas. Mexico to Colombia. Plants erect or scandent; leaflet 1, linear or oblong, sparsely strigose; flowers bright purple, 1.5 cm. long.

Cologania pulchella HBK. Thickets and forests of the Meseta Central, 1,200–1,400 meters. Mexico to Peru. A slender

vine, densely pilose; leaflets 3, ovate, acute; flowers 2 cm. long or more.

CONDYLOSTYLIS Piper

The genus consists of two species, the other Colombian.

Condylostylis venusta Piper, Contr. U. S. Nat. Herb. 22: 667. *pl. 64*. 1926. Surubres, near San Mateo, Prov. Alajuela, *Biolley 7034*. Also Río Ceibo, near Buenos Aires. British Honduras. A scandent herb; leaflets 3, ovate, acute, glabrous; peduncles axillary, the 5–12 flowers purple, 2.5 cm. long; legume linear, dehiscent, somewhat compressed, 5 cm. long, with 6–7 seeds.

CROTALARIA L.

Herbs or shrubs; leaflets 3 or sometimes 1; flowers yellow, rarely blue, racemose or sometimes solitary; fruit oblong or globose, inflated.—Other species are known from Central America.

Crotalaria guatemalensis Benth. *Chipilín, Quiebra-plata. C. Carmioli* Polak. Linnaea 41: 558. 1877 (without exact locality, *Polakowsky 306*). Common in fields and thickets, Meseta Central to the Pacific coast. Panama to Mexico. An erect, branched herb a meter high; leaflets 3, lanceolate or narrowly elliptic, acute or acuminate, glabrous above, strigose beneath; racemes opposite the leaves, short, the flowers yellow. It is possible that this species is synonymous with *C. vitellina* Ker, to which some of the material has been referred. Other collections have been determined as *C. anagyroides* HBK. In some parts of Central America the leaves and young branches of this and other species are utilized as pot herbs (*quelites*).

Crotalaria incana L. *Quiebra-plato.* Common in cultivated and waste ground, Meseta Central and probably in the coasts. A species of wide distribution. An erect herb a meter or less in height, villous throughout; leaflets 3, rounded or elliptic, rounded at the apex; flowers yellow. A common weed in many parts of Central America.

Crotalaria longirostrata Hook. & Arn. Thickets of the Meseta Central. Extending to Mexico. An erect, branched herb, a meter high or less; leaflets 3, oblong, rounded at the apex, glabrous above, strigose beneath; flowers yellow, in elongate, terminal racemes.

Crotalaria pterocaula Desv. El Rodeo de Pacaca; Cima Grande, between San Ramón and Atenas. Ranging to Brazil. An

erect, low herb, usually simple, strigose; leaves simple, strigose; stems winged; flowers 1 cm. long, in very short racemes. A plant of savannas or other grassy places.

Crotalaria retusa L. *Gallincillo, Quiebra-plato, Patillo.* Atlantic coast, sometimes abundant on beaches. Almost pantropic in distribution. An erect herb a meter high or less; leaflet 1, obovate, rounded at the apex, finely strigose; flowers 2–2.5 cm. long, the petals yellow within, brownish red outside; fruits glabrous.

Crotalaria sagittalis L. *Quiebra-plato.* Common in grassy places, Meseta Central to the coasts. Widely distributed in America. Plants annual or perennial, erect or procumbent, the stems simple or branched; leaflet 1, oblong, pilose; flowers yellow, small, in short racemes; stems winged. Costa Rican collections have been referred to *C. ovalis* Pursh, a species that probably can not be maintained as distinct from *C. sagittalis.*

Crotalaria verrucosa L. Puntarenas, *Brenes 12366.* Widely distributed in the tropics of both hemispheres; in Central America seldom common, and growing mostly near seashores. An erect herb, minutely appressed-pilose or almost glabrous; leaves simple, broadly ovate or ovate-elliptic, obtuse or rounded at the apex, narrowed to the base; flowers racemose, blue, the corolla 1–1.5 cm. long; fruit appressed-pilose.

DALBERGIA L. f.

Reference: Pittier, Journ. Wash. Acad. Sci. 12: 54. 1922.

Shrubs or trees; leaves pinnate or sometimes 1-foliolate, the leaflets alternate along the rachis; flowers small, in axillary racemes or panicles; fruit small, flat, short or elongate.—Other species occur in Central America.

Dalbergia Brownei (Jacq.) Urban. Thickets of the coasts, usually growing near the sea. Widely distributed in America. A shrub or small tree, the branches often elongate and pendent; leaflet 1, ovate or oblong-ovate, somewhat cordate at the base, glabrous or nearly so on the lower surface; flowers small, white; fruit 1–3-seeded. One of the most common and characteristic strand shrubs.

Dalbergia Ecastophyllum (L.) Taub. Common in coastal thickets. Widely distributed in tropical America. A shrub or tree of 3–7 meters, sometimes forming dense thickets, the branches often greatly elongate; leaflet 1, oblong-ovate, obtuse or rounded

at the base, 7–13 cm. long, finely strigose beneath; flowers white, 8 mm. long; fruit rounded, 2–2.5 cm. long, 1-seeded.

Dalbergia hypoleuca Pittier, Journ. Wash. Acad. Sci. 12: 62. 1922. *Cocobola.* El Escobal, near Atenas, *Federico Golcher.* Guanacaste. Endemic. A tree; leaflets 7–11, ovate, 3–7 cm. long, obtuse or subretuse, pale and finely pubescent beneath; legume 8–16 cm. long, 1–1.5 cm. wide, 3–5-seeded. This probably is not distinct from *D. lineata.*

Dalbergia lineata Pittier, Journ. Wash. Acad. Sci. 12: 63. 1922. *Cocobola. Amerimnon lineatum* Standl. Journ. Wash. Acad. Sci. 13: 442. 1923. Nicoya, *Tonduz 13969.* Dry forests of the Pacific coast. Endemic. A large, deciduous tree with rounded crown; leaflets 8–15, ovate or oblong, 4–8 cm. long, obtuse, pubescent beneath; flowers white, paniculate, 1.5 cm. long; legume elongate, 2 cm. wide, several-seeded.

Dalbergia monetaria L. f. Thickets of the Atlantic coast. Guatemala to the Guianas. A shrub or small tree, glabrous; leaflets 1–5, oblong or ovate, acuminate; flowers in short, dense racemes, white; legume thick, rounded or oval, 1-seeded.

Dalbergia retusa Hemsl. *Cocobola.* Pacific coast. Also in Panama. A tree; leaflets 7–15, ovate or oblong, pubescent beneath or almost glabrous; flowers white, 1.5 cm. long; legume elongate, several-seeded. It may well be that *D. lineata* is merely a form of this species. It is from this tree and its relatives that there is obtained the cocobola wood of the Pacific coast of Central America. Cocobola is noteworthy for its handsome color and fine grain. Exported to the United States and Europe, it is employed for knife handles and other similar articles. In Costa Rica it is used for construction of various kinds and cabinetwork. The wood is hard, heavy, reddish, pink, or yellowish with veins or stripes of purple or black, and durable. For these species there are reported from Costa Rica also the names of Ñambar and Ñamba.

DESMODIUM Desv.

Erect or prostrate herbs, sometimes shrubs, occasionally scandent; leaflets 3 or rarely 1, entire; flowers small, white, pink, or purple, racemose or fasciculate; fruit compressed, composed of few or numerous 1-seeded joints that separate at maturity.—Many other species are known from Central America. The joints of the fruit,

usually covered with small, hooked hairs, adhere closely to clothing and to fur and feathers of animals. The plants usually are known in Central America by the names Mozote and Pegapega.

Desmodium adscendens (Swartz) DC. Thickets and grassy places, Meseta Central to the coasts. A species of wide distribution. An erect or procumbent herb, the stems reddish brown; leaflets rounded, 1–2.5 cm. long, rounded at the apex, strigose; flowers purple, 5 mm. long; fruit pubescent, the joints about 4, straight on the upper margin.

Desmodium affine Schlecht. *D. albiflorum* Salzm. Thickets and forests, Meseta Central to the Atlantic coast. A species of wide distribution. Plants slender, prostrate or procumbent; leaflets ovate, obtuse, pale and pubescent beneath; flowers white or pink, in elongate racemes; fruit with about 4 joints, these straight on the upper margin, deeply notched on the lower.

Desmodium angustifolium (HBK.) DC. Reported from the region of Cartago. A species of wide distribution in tropical America. An erect herb; leaflet 1, linear; fruit notched on both margins.

Desmodium asperum (Poir.) Desv. El Rodeo de Pacaca; region of San Ramón. A species of wide distribution. An erect herb 1–2 meters high, pilose; leaflets ovate or oblong, obtuse or acute; stipules large, green, persistent; flowers purple; fruit notched on both margins, 2 mm. wide.

Desmodium axillare (Swartz) DC. Common in the coasts; San Ramón. A species of wide distribution. Plants procumbent, herbaceous; leaflets ovate or elliptic, obtuse or acute, pubescent or almost glabrous; flowers pink or purple; fruit usually 2-articulate, notched on both margins.

Desmodium barbatum (L.) Benth. & Oerst. Grassy places or thickets, Meseta Central to the Pacific coast. A species of wide distribution. A low plant, erect or ascending; leaflets 3, oblong to rounded, 1–2 cm. long, rounded at the apex, strigose beneath; racemes dense, covered with long hairs; flowers purple; fruit 2-articulate, straight on the upper margin, notched on the lower.

Desmodium cajanifolium (HBK.) DC. Meseta Central to the Pacific coast. Mexico to Brazil. Plants tall, erect; leaflets 3, large, elliptic to lanceolate, obtuse or acute, soft-pilose; flowers purple, in paniculate racemes; fruit with many joints, notched more deeply on the upper margin than on the lower.

Desmodium campyloclados Hemsl. Biol. Centr. Amer. Bot. 1: 276. 1880. Based in part upon a collection from Candelaria, *Oersted*. Region of San Ramón. Also in Nicaragua. Scandent; leaflets ovate-lanceolate, acute, softly pilose, 2.5–5 cm. long; fruit of 4–5 oblique-ovate joints, these becoming as much as 2–2.5 cm. long.

Desmodium caripense HBK. Forests or thickets, mountains of the central region. Ranging to Venezuela. A procumbent herb; leaflets 3, ovate or lanceolate, acuminate, glabrous or nearly so; fruit densely pubescent, notched on both margins, with few joints.

Desmodium costaricense (Schindl.) Standl., comb. nov. *Meibomia costaricensis* Schindl. Repert. Sp. Nov. 20: 140. 1924. Cornfields of Santa Rosa de El Copey, 1,800 meters, *Tonduz 11769* in part. Also near Heredia, La División, and region of San Ramón, 1,000 meters. Endemic. A shrub(?); leaflets 3, oval or elliptic, pilose; racemes elongate; corolla rose-purple; fruit with 3–5 joints, notched on both margins. Referred to *D. uncinatum* by Micheli.

Desmodium distortum (Aubl.) Macbride. *D. purpureum* Fawc. & Rendle, non Hook. & Arn. Waste places of the Atlantic coast. A species of wide distribution in tropical America. Plants erect and branched; leaflets 3, ovate or oblong, obtuse, somewhat pubescent, or almost glabrous; flowers purple; fruit with 3–6 joints, notched on both margins, twisted.

Desmodium frutescens (Jacq.) Schindl. *D. incanum* DC. Common in waste or cultivated ground of the tierra caliente. Widely distributed in tropical America. Plants herbaceous, erect or procumbent; leaflets 3, oblong to ovate, obtuse or acute, pale and strigose beneath; flowers pale purple, in elongate racemes; fruit with few joints, straight on the upper margin, notched on the lower.

Desmodium Hjalmarsonii (Schindl.) Standl., comb. nov. *Meibomia Hjalmarsonii* Schindl. Thickets of the central region; region of San Ramón. Extending to Guatemala. Plants procumbent or somewhat scandent, densely pilose; leaflets ovate or oblong, acute or obtuse, densely pilose, with a large blotch of silver on the upper surface; flowers greenish or pink, the bracts inconspicuous and caducous; fruit 8–10-articulate.

Desmodium infractum DC. *D. Barclayi* Benth. Thickets of the Pacific coast. Also in Nicaragua and Salvador. A scandent herb; leaflets 3, ovate, pubescent; joints of the fruit 2, rounded-reniform, 1 cm. broad. Easily recognized by the large joints of the fruit.

Desmodium intortum (Mill.) Fawc. & Rendle. *D. uncinatum* DC. Thickets and forest, Meseta Central to the coasts. Widely distributed in tropical America. Plants elongate and somewhat scandent, the stems 3-angulate; leaflets 3, ovate or lanceolate, soft-pilose; flowers purple, in elongate racemes, the bracts large but deciduous; fruit of 3–10 joints, notched on both margins.

Desmodium Maxonii Standl. Oak forests of Cantón de Dota, 1,500–2,300 meters. Panama. Plants erect, somewhat woody, 1 meter high, the stems hirsute with slender, white hairs; leaflets oblong or ovate, obtuse or acute, densely pilose; flowers purple, large; fruit 4–6-articulate, equally notched on both margins.

Desmodium molle (Vahl) DC. *Meibomia mollis* Kuntze. Nicoya. Ranging to Mexico and West Indies. An erect herb of 1–2 meters; leaflets 3, ovate, acute, pubescent; flowers purple, in paniculate racemes; fruit of 4 joints but only the terminal one fertile.

Desmodium procumbens (Mill.) Hitchc. *D. spirale* DC. Thickets of the Meseta Central. Widely distributed in tropical America. Plants slender, erect or procumbent; leaflets 3, rounded to oblong, acute or obtuse, 1–5 cm. long, somewhat pubescent or almost glabrous; flowers purple; fruit with 2–8 joints, twisted, notched on both margins.

Desmodium rhynchodesmum (Blake) Standl., comb. nov. *Meibomia rhynchodesma* Blake, Bot. Gaz. 78: 278. 1924. Tuis, 650 meters, *Tonduz 11448*. Known only from the original collection. Plants scandent; leaflets 3, ovate, acute or subobtuse, 6–8 cm. long, pubescent beneath; flowers paniculate; fruit with only 2 rounded joints.

Desmodium Scorpiurus (Swartz) Desv. Common in waste or cultivated ground of the tierra caliente, ascending to the Meseta Central. A species of wide distribution in tropical America. Plants small, prostrate or procumbent; leaflets 3, small, oblong to ovate, obtuse, strigose beneath; flowers few, small, purple, in short racemes; fruit with very narrow and elongate joints. The plant grows abundantly about dwellings.

Desmodium sericeum (Schindl.) Standl., comb. nov. *Meibomia sericea* Schindl. Repert. Sp. Nov. 20: 142. 1924. Tres Ríos, *Pittier 95*. Also El Copey, and region of San Ramón. Endemic. Leaflets 3, ovate, obtuse, sericeous beneath; flowers in elongate racemes; fruit with about 6 joints, notched on both margins.

Desmodium strobilaceum Schlecht. Region of Cartago. Extending to Mexico. Plants herbaceous, erect or decumbent; leaflets 3, oblong, acute, sericeous and pale beneath; flowers purple, in long, dense racemes, the bracts large, deciduous; fruit with numerous joints, pubescent, notched on both margins.

Desmodium triflorum (L.) DC. Common about dwellings or in grassy places, Meseta Central to the Pacific coast, and probably also in the Atlantic. A species of wide distribution. Plants prostrate and rooting at the nodes, small; leaflets 3, rounded, 4–5 mm. long, almost glabrous; flowers clustered in the leaf axils, small, pale purple; fruit small, straight on the upper margin, notched on the lower.

DIOCLEA HBK.

There are other species in Central America and probably also in Costa Rica.

Dioclea guianensis Benth. Common in thickets near the coasts. A species of wide distribution. A large, somewhat woody vine; leaflets 3, elliptic or ovate, acuminate, densely pubescent or almost glabrous; flowers large, purple, in very long, axillary racemes; legume linear, dehiscent, 1.5 cm. wide, densely pilose.

Dioclea reflexa Hook. Region of San Ramón, at 850–1,000 meters. Central America to northern South America. A large, more or less woody vine; leaflets large, elliptic or broadly ovate, abruptly short-acuminate, glabrate beneath; flowers purple, showy, the bracts long and narrow, conspicuous, reflexed; fruit large, oblong, 5 cm. wide or broader.

DIPHYSA Jacq.

Trees or shrubs; leaves pinnate, the leaflets small; flowers yellow, in short, axillary racemes, pedicellate; fruit stipitate, oblong, indehiscent, the exocarp separating from the endocarp and conspicuously inflated.—Other species occur in Central America. The wood is yellow, hard, heavy, and fine-grained. It is employed for construction and for railroad ties. It yields a yellow dye.

Diphysa humilis Oerst. Vid. Medd. Kjoebenhavn 12. 1853. *Naguapate* (Oersted). Volcán Rincón, Guanacaste, *Oersted 4665*. Known only from Guanacaste. A tree with horizontal trunk, the branches only 15–30 cm. high; leaflets 5–9, oval or oblong, 1–2 cm. long; inflorescence with glandular hairs; flowers 1 cm. long; fruit 3–4 cm. long, puberulent and glandular. The habit, as described, is quite different from that of other species.

Diphysa robinioides Benth. *Guachipelín.* Meseta Central to the Pacific coast, and in the Atlantic tierra caliente (Tucurrique). Panama to Mexico. A tree of 4–15 meters; leaflets 9–15, oval, glabrous, 1.5–3.5 cm. long, pale beneath; inflorescence without glandular hairs; flowers 2 cm. long; fruit 6–11 cm. long, glabrous.

DIPTERYX Schreb.

There is a single species in Central America.

Dipteryx panamensis (Pittier) Record. Forests of Atlantic coast. Also in Nicaragua and Panama. A tree of 15–50 meters, the trunk up to a meter in diameter; leaves pinnate, the leaflets 5–8-jugate, oblong, obtuse or acute, almost glabrous, the costa closer to the lower margin than to the upper; flowers pink, in terminal panicles; fruit ellipsoid, 6 cm. long, 3.5 cm. wide, 1-seeded. The ripe fruits are filled with an oily, fragrant liquid that crystallizes when the fruit dries. The roasted seeds are eaten in some parts of Panama. The wood, because of its weight and hardness, is little used. From the fruits of a South American species, *D. odorata*, Cumaru or Tonka bean, is obtained a substance, coumarin, employed in the preparation of perfumes. Referred originally to *Coumarouna.*

DOLICHOS L.

Dolichos Lablab L. *Chimbolo verde.* Cultivated in some places. Native of Africa, but naturalized in various regions of America. A herbaceous vine; leaflets 3, broad; flowers large, white or purple, in long, axillary, pedunculate racemes; legume flat, 7.5 cm. long, 2.5 cm. wide, the few seeds black. The tender pods are eaten, but not the seeds. The plant is a rather handsome one because of its large flowers, and it is often cultivated for ornament.

DUSSIA Krug & Urban

No other species are known from Central America.

Dussia macroprophyllata (Donn. Smith) Harms, Repert. Sp. Nov. 24: 212. 1928. *Diplotropis macroprophyllata* Donn. Smith, Bot. Gaz. 56: 56. 1913. Forests of Las Vueltas, near Tucurrique, 635 meters, *Tonduz 12949.* Known only from the original collection. A tall tree with rounded crown; leaves pinnate, the leaflets 9, oval, rounded at the apex, 6–16 cm. long, glabrous above, pubescent beneath; flowers in large, pseudoterminal panicles, pedicellate, 1.5 cm. long.

ERIOSEMA Desv.

Small, erect, perennial herbs; leaflets 3 or 1, with small glands on the lower surface; flowers yellow, in short racemes; legume small, compressed, dehiscent, usually 2-seeded.—Two other Central American species grow in Guatemala and British Honduras.

Eriosema crinitum (HBK.) Don. Savannas of the Pacific tierra caliente. Mexico to Brazil. Plants about 30 cm. high; leaflets usually 3, linear-oblong, brown-hirsute.

Eriosema diffusum (HBK.) Don. Grassy places, region of Cartago, and Pacific slope. Widely distributed in tropical America. Leaflets 3, oblong, sericeous with short, appressed, whitish hairs.

Eriosema simplicifolium (HBK.) Walp. In savannas of the southeastern coast. Ranging to Brazil. Leaflet 1, oblong or ovate, brown-hirsute. Known in Central America only from this region.

ERYTHRINA L.

Reference: Standley, Contr. U. S. Nat. Herb. 20: 175. 1919.

Shrubs or trees, usually armed with short prickles; leaflets 3; flowers large and showy, racemose; standard much longer and usually much narrower than the other petals, generally sword-shaped; fruit linear, terete or slightly compressed, constricted between the large seeds.—Several other species grow in Central America.

Erythrina cochleata Standl. Contr. U. S. Nat. Herb. 20: 179. 1919. Finca La Colombiana, Atlantic coast, *Tonduz 223*. Known only from the original collection. Leaflets ovate, glabrous when fully developed; calyx 2 cm. long, deeply incised on one side, tomentose; standard narrow, 7 cm. long; pod spirally twisted to form a complete circle; seeds scarlet.

Erythrina costaricensis Micheli, Bull. Herb. Boiss. 2: 445. *pl. 12*. 1894. *Poró, Poró colorado, Elequeme.* Near Boruca, *Tonduz 4804*. Forests of the Pacific coast, also in the upper part of the Atlantic tierra caliente. Endemic. A tree of 5–15 meters; leaflets rounded or deltoid, sericeous beneath, at least when young; flowers bright red, the calyx shortly bilobate; pod deeply constricted between the seeds. The seeds are called Coralillos.

Erythrina crista-galli L. Planted for ornament in the region of San José. Native of Brazil. A prickly shrub; leaflets broadly

elliptic or ovate, often prickly beneath; flowers crimson, in long racemes, the standard 4 cm. long, very broad.

Erythrina glauca Willd. In swamps of the Pacific coast, and perhaps also of the Atlantic. Central America to Venezuela. A tall tree; leaflets pale and sericeous beneath; flowers orange, the standard very broad. In Panama this tree is known by the names Gallito, Pito, Palo bobo, and Palo santo. The tree is exceptionally showy when covered with its large, bright-colored flowers. The leaflets fold together in the evening.

Erythrina gibbosa Cufodontis, Archivio Bot. 10: 34. 1934. La Palma de San Ramón, 1,200–1,300 meters, *Brenes 828*. A small tree with long, prickly branches; inflorescence spike-like, the flowers bright red; calyx obliquely funnelform or subcampanulate, 14 mm. long, dilated above the middle, the apex obliquely truncate, gibbous ventrally above the middle; standard 3.5–4 cm. longer than the calyx. The leaves have not been described. The species is known to the writer only from the description.

Erythrina globocalyx Porsch & Cufod. Archivio Bot. 10: 35. *pl. 1*. 1934. Las Nubes, Prov. San José, 1,250 meters, *Porsch 835*. A tree as much as 5 meters high; leaflets broadly deltoid-ovate, 5–6 cm. long, short-acuminate; racemes subsecund, the flowers 5 cm. long; calyx globose-ovoid, almost 1.5 cm. long, 8 mm. broad, fleshy, glabrous, obsoletely bilobate at the apex; standard exserted for 3 cm., 5–6 mm. wide. Known to the writer only from the original description and illustration. The species was based upon a photograph and notes made by Porsch.

Erythrina lanceolata Standl. Contr. U. S. Nat. Herb. 17: 432. 1914. *Poró*. San Cristóbal de Candelaria, Prov. Cartago, 1,700 meters, *Wercklé 3693*. Along streams in the regions of Cartago and Dota. Endemic. A shrub or small tree, sometimes procumbent upon rocks or cliffs; leaflets lanceolate or ovate; flowers red, the calyx shortly bilobate.

Erythrina Poeppigiana (Walp.) Cook. Formerly planted for shade in cacao and coffee plantations of the Atlantic coast, and now thoroughly naturalized in many localities, as at Orosi and La Colombiana. Native of Peru. A tree 9–20 meters high, the bark pale and smooth; leaflets broad, glabrous, pale beneath; flowers orange, the standard broad, 3–4 cm. long; seeds dark brown. A very ornamental tree, abundant in many of the abandoned plantations of the Atlantic plains.

Erythrina rubrinervia HBK. *Poró, Poró de montaña.* Abundant in the Meseta Central, extending to the coasts. Mexico to Colombia. A shrub or tree of 2–10 meters; leaflets broad, pale beneath, almost glabrous; flowers red or pink, the standard narrow; seeds red. The wood is very soft. The tree is used throughout the central region for forming live hedges and for living fence posts, and formerly it was planted as coffee shade. The trees of the temperate region almost always have bright red flowers, while those of the tierra caliente have much paler, pink flowers. The name Pitos or Cuchillos is given to the flowers, and that of Nenes to the seeds. The young flowers are cooked and eaten in large quantities in some parts of Central America, prepared like string beans, which they somewhat resemble when cooked. The young leaves also are sometimes used as a vegetable. There is a belief that eating the flowers results in great drowsiness, a supposition that may be well based, since the seeds of some species of *Erythrina* are known to have narcotic and even poisonous properties. For this species there are reported the following Indian names: Boró (Cabécara); Brukrá, Burú-krá (Brunka); Froró, Fru (Térraba); Kueri-kangi (Guatuso).

GALACTIA P. Br.

Other species are known from Central America.

Galactia tenuiflora (Willd.) Wight & Arn. Reported from Guanacaste; region of San Ramón. A species of wide distribution in tropical America. A slender, scandent herb, pubescent or almost glabrous; leaflets 3, ovate or oblong, 2.5–5 cm. long, obtuse; flowers small, purple, in long, slender, pedunculate, axillary racemes; legume compressed, linear, 2.5–5 cm. long, 5–6 mm. wide. It is not improbable that the plant reported from Costa Rica is really *G. striata* (Jacq.) Urban.

GLIRICIDIA HBK.

Only one species is known from Central America.

Gliricidia sepium (Jacq.) Steud. *Madera negra, Madre de cacao, Sangre de drago* (Cantón de Osa). Meseta Central to the coasts, often planted but abundantly native in many regions, especially on the Pacific slope. A species of wide distribution in tropical America. A small or medium-sized tree; leaves pinnate, the 7–15 leaflets elliptic, spotted beneath with pale purple; flowers pink, 2 cm. long, in axillary racemes; legume linear, dehiscent, 10–15 cm. long, 1.5 cm. wide. Of this species Pittier writes: "From

the very beginning of agriculture in the Spanish American colonies, and perhaps even earlier in the crude clearings of the Indians, the *madera negra* has been considered the best protection for cacao plantations, whether for shade or for its fertilizing activity, or on account of the fear that small rodents have for its poisonous roots. It is employed also as shade in coffee plantations, but its foliage is thin, and disappears completely toward the end of the dry season. In the tierra caliente it grows well from branches stuck in the ground, and is employed extensively for living posts in wire fences. The wood is very durable in the soil. Cattle eat the leaves, which are highly nutritious."

The tree is a handsome one when covered with its beautiful flowers, especially since it often forms pure stands of considerable extent. The wood is reddish purple, hard, heavy, strong, and fine-grained. In many regions the seeds and leaves are utilized for poisoning mice and other animals, while elsewhere the flowers are fried and eaten! Pittier reports the following Indian names: Surí-kri (Cabécara); Aí-krá (Brunka).

INDIGOFERA L.

Herbs or shrubs, the pubescence often of short or closely appressed hairs that are attached by their middle; leaves pinnate, with numerous leaflets or rarely only 1 leaflet; flowers small, in axillary racemes or spikes; fruit usually oblong or linear, angulate, terete, or compressed.—Other species occur in Central America.

Indigofera costaricensis Benth. Vid. Medd. Kjoebenhavn 5. 1853. San José, *Oersted.* Common in thickets and hedges of the Meseta Central. Endemic. A shrub of 1–2.5 meters, almost glabrous; leaflets 11–15, elliptic, 1.5–3 cm. long, strigose beneath, glabrous above; flowers whitish or pink, 6 mm. long; fruit 3 cm. long, straight, 10–12-seeded.

Indigofera lespedezioides HBK. Savannas of the Pacific tierra caliente. Mexico to Brazil. An erect herb of 30–60 cm. with numerous stems; leaflets 1–7, obovate to almost linear, 1–4 cm. long; flowers 6–7 mm. long, reddish; fruit 2–3 cm. long, straight.

Indigofera mucronata Spreng. Thickets and waste ground, Meseta Central to the coasts, common in many localities. Widely distributed in tropical America. Plants herbaceous, erect or often greatly elongate and somewhat scandent; leaflets 5–7, elliptic, somewhat strigose; flowers 6 mm. long, dull red; fruits reflexed,

almost straight, 2.5–4 cm. long, very slender. Reported from Costa Rica under the name *I. tephrosioides* HBK.

Indigofera suffruticosa Mill. *Añil, Jiquelite. I. Anil* L. Common in waste ground of the tierra caliente. A species of wide distribution. A shrub about a meter high; leaflets 9–15, elliptic, strigose; flowers small, reddish; fruit somewhat curved, 1.5–2 cm. long. This plant, which yields indigo (*añil*) dye, never was of great importance in Costa Rica, although it was grown upon a large scale in other parts of Central America before the introduction of coffee. It still is cultivated for export in Salvador, but indigo now is largely replaced by synthetic dyes. In other parts of the world other species of *Indigofera* have been grown for the production of indigo. The name Añil refers particularly to the dye, the term Jiquelite to the plant that produces it. Pittier reports the Indian names of Tibi-káh (Brunka) and Debé-ira (Térraba).

LATHYRUS L.

Lathyrus odoratus L. *Chureca.* An ornamental plant of gardens, native of southern Europe. Known in the United States by the name of Sweet Pea.

LEYCEPHYLLUM Piper

The genus consists of a single species.

Leycephyllum micranthum Piper, Journ. Wash. Acad. Sci. 14: 364. 1924. Las Vueltas, Tucurrique, 635 meters, *Tonduz 12951.* Known only from the original collection. A scandent shrub, the stems at first puberulent, later glabrate; stipules lanceolate, striate; leaves trifoliolate, the leaflets entire, membranaceous, broadly ovate or suborbicular, 3-nerved from the base, acuminate, broadly cuneate to the rounded or subcordate base, sparsely puberulent above, especially on the nerves; flowers small, yellow, racemose, the peduncles arising from the axils of the upper leaves, 5–6 cm. long; calyx densely brown-puberulent; corolla about 5 mm. long. The author of the genus states that it is related to *Calopogonium.*

LONCHOCARPUS HBK.

Reference: Pittier, Contr. U. S. Nat. Herb. 20: 37. 1917.

Trees or tall shrubs; leaves pinnate, the leaflets few or numerous, opposite; flowers large, showy, pink or purple, in paniculate racemes; legume flat, oblong or linear, indehiscent.—A good many other

species are known from Central America. From some of the South American species is obtained a principle called rotenone, which has come into prominence in recent years as an insecticide. It is not known whether the Central American species contain the same principle. The South American plants sometimes are employed as barbascos, for stupefying fish.

Lonchocarpus atropurpureus Benth. *Chaperno.* Regions of Cartago and San Ramón; Guanacaste. Mexico to Colombia. A tree of 5–12 meters; leaflets 5–9, lanceolate to oblong-ovate, 2–7 cm. long, obtuse or acute, somewhat pubescent beneath; flowers rose-purple; legume flat, stipitate, linear-oblong, 4–10 cm. long, 1 cm. wide.

Lonchocarpus costaricensis (Donn. Smith) Pittier, Contr. U. S. Nat. Herb. 20: 58. *pl. 2.* 1917. *Pavilla. Derris costaricensis* Donn. Smith, Bot. Gaz. 44: 110. 1907. Nicoya, *Tonduz 13993.* Dry forests of the Pacific tierra caliente. Endemic. A deciduous tree; leaflets 5–7, ovate or obovate, 6–12 cm. long, rounded and emarginate at the apex, densely and softly pilose beneath when young; flowers dark red or purple; legume ovate-elliptic or obovate-lanceolate, 12–16 cm. long, 4 cm. wide, 1–2-seeded. The wood is hard and strong.

Lonchocarpus guatemalensis Benth. *Chaperno.* Dry forests of the Pacific tierra caliente. Ranging to southern Mexico. A tree of 7–11 meters; leaflets 5 or 7, ovate-oblong, coriaceous, 4–6.5 cm. long, acute, glabrous; flowers pinkish purple; legume linear-oblong, almost 2 cm. wide, few-seeded.

Lonchocarpus latifolius (Willd.) HBK. Coto. Guatemala to Panama, and in the West Indies. A medium-sized tree; leaflets 5–9, oblong or obovate, 9–20 cm. long, pale and somewhat pubescent beneath; flowers purple or reddish; legume lanceolate, almost sessile, 4.5–6.5 cm. long, 2–2.5 cm. wide, 1–5-seeded.

Lonchocarpus lucidus Pittier, Contr. U. S. Nat. Herb. 20: 77. *f. 27.* 1917. Santo Domingo de Osa, *Tonduz 9950.* Forests of the coasts; region of San Ramón. Also in Panama. A medium-sized tree with rounded crown; leaflets 7–13, coriaceous, ovate or obovate, 6–11 cm. long, short-acuminate, glabrous; flowers purple; legume flat, 3–11 cm. long, 1.7 cm. wide, 1–4-seeded. In Panama the species is known by the name Siete cueros.

Lonchocarpus minimiflorus Donn. Smith. *Chaperno.* Dry forests of Guanacaste. Extending to southern Mexico. A tree of

5–10 meters, the crown broad and depressed; leaflets 7–13, ovate or lanceolate, obtuse or acute, 2–7 cm. long, finely pubescent beneath; flowers small, purple; legume linear-oblong, 3–6 cm. long, 1 cm. wide, glabrous, few-seeded.

Lonchocarpus nicoyensis (Donn. Smith) Pittier, Contr. U. S. Nat. Herb. 20: 57. *pl. 2.* 1917. *Derris nicoyensis* Donn. Smith, Bot. Gaz. 44: 111. 1907. Hills of Nicoya, *Tonduz 13547.* Known only from the region of Nicoya. Leaflets 5, coriaceous, ovate, acuminate, 5–9 cm. long, pubescent beneath; flowers red; legume ovate-lanceolate, acuminate, 6.5 cm. long, 3 cm. wide, 1-seeded.

Lonchocarpus orotinus Pittier, Contr. U. S. Nat. Herb. 20: 74. *pl. 5.* 1917. Bahía de Salinas, Guanacaste, *Tonduz 2731.* Pacific tierra caliente. Endemic. A tree of 8 meters; leaflets 5–9, ovate-lanceolate to ovate-elliptic, acuminate, 2–7.5 cm. long, sparsely pubescent; legume elongate, stipitate, 3.5–6.5 cm. long, 1.5 cm. wide, 1–2-seeded.

Lonchocarpus peninsularis (Donn. Smith) Pittier, Contr. U. S. Nat. Herb. 20: 56. *pl. 2.* 1917. *Chaperno. Derris peninsularis* Donn. Smith, Bot. Gaz. 44: 111. 1907. Hills of Nicoya, *Tonduz 13961.* Forests of the Pacific tierra caliente. Endemic. A tree of 8 meters; leaflets 5, obovate or elliptic, 4.5–8.5 cm. long, acuminate, finely and densely pubescent beneath; flowers pink; legume obliquely ovate, 6.5 cm. long, 3–3.5 cm. wide, 1-seeded.

LOTUS L.

Lotus corniculatus L. Frequent in pastures on the volcanoes of Irazú and Turrialba. Native of Europe. A small, perennial herb, almost glabrous; leaves sessile, pinnate, the 5 leaflets obovate, entire, rounded at the apex, 1–1.5 cm. long; flowers yellow, umbellate, the peduncles elongate; legume flat, linear. Probably imported with grass seeds, and now well established in Costa Rican pastures, where it is eaten by cattle. It is said that the plant never flowers in Costa Rica, and I was unable to find any plants in blossom.

LUPINUS L. Lupine

Herbs or low shrubs; leaves digitately compound, petiolate, with few or numerous entire leaflets; flowers showy, spicate or racemose; calyx bilabiate; legume oblong, compressed, dehiscent, with few or numerous seeds.—There are a few other Central American species of this large genus, which has numerous species in western United States and the South American Andes.

Lupinus Aschenbornii Schauer. Meadows of Volcán de Irazú, 1,600–3,300 meters. Ranging to Mexico. An erect, branched herb, the branches densely pilose with short hairs; leaflets about 10, obtuse, 2–3.5 cm. long, glabrous above, pubescent beneath; flowers blue, 1 cm. long; legume about 2.5 cm. long and 6 mm. wide, villous.

Lupinus Clarkei Oerst. Vid. Medd. Kjoebenhavn 1. 1853. Volcán de Irazú, *Oersted.* Meadows of Irazú, 1,500–2,700 meters. Also on Volcán de Chiriquí, Panama. A meter high or lower, the branches tomentose; leaflets 5–7, narrow, obtuse, 3–6.5 cm. long, glabrous or somewhat pubescent above, pubescent beneath; flowers blue, 12 mm. long, in elongate racemes, the bracts short; legume about 4 cm. long and 8 mm. wide, villous.

Lupinus hirsutus L. *Corazón tranquilo.* An ornamental garden plant, imported from Europe. An erect herb, the showy flowers white or purple.

Lupinus Valerioi Standl., sp. nov.—Perennis ramosa, caulibus pilis longissimis hirsutis; stipulae maximae lineares; foliola 7–10 lineari-oblonga obtusa et apiculata, versus basin sensim angustata, supra glabra, subtus paullo pallidiora ad costam atque ad margines longipilosa, aliter glabra vel sparse pilosa; racemi elongati multiflori, bracteae lineari-attenuatae hirsutae floribus paullo longiores; calyx profunde bilabiatus hirsutus, segmentis lineari-attenuatis; legumen oblongum acutum densissime hispidum.—Cerro de Las Vueltas, Prov. San José, 2,700–3,000 meters, *Standley & Valerio 43668* (Herb. Field Mus., type). There is referred here also *No. 43974* of the same collectors.—An erect herb of 60–90 cm., the branches covered with very long and slender hairs; stipules very large, their divisions linear; leaflets 7–10, narrow, 4–7 cm. long, obtuse, glabrous above, somewhat villous beneath; racemes elongate, the bracts narrow, longer than the flowers; flowers blue, 12 mm. long; legume oblong, 3.5 cm. long, 9 mm. wide, covered with long, brownish hairs.

MACHAERIUM Pers.

Reference: Pittier, Contr. U. S. Nat. Herb. 20: 467. 1922.

Trees or shrubs, sometimes scandent, usually armed with spines; leaves pinnate, with few or numerous large or small leaflets; flowers small or medium-sized, racemose or paniculate, mostly purple, pink, or white; fruit samara-like, 1-seeded, compressed, terminating in a broad wing.—Other species grow in Central America.

Machaerium biovulatum Micheli. *Jarro caliente. M. Langlassei* Micheli. Thickets or dry forest, Meseta Central and Guanacaste. Ranging to Mexico. A scandent shrub, armed with short spines; leaflets 11–21, oval or obovate, 2–4 cm. long, rounded and emarginate at the apex, almost glabrous; flowers purple, in large panicles; samara 6–7 cm. long.

Machaerium costaricanum Pittier, Contr. U. S. Nat. Herb. 20: 475. 1922. Río Ceibo, near Buenos Aires, 300 meters, *Tonduz 3816*. Reported from El General. Endemic. An unarmed shrub; leaflets 41–55, oblong, 2–3.5 cm. long, 5–8 mm. wide, somewhat tomentose, rounded at the apex; flowers 9 mm. long, in large panicles.

Machaerium Donnell-Smithii Standl., nom. nov. *Drepanocarpus costaricensis* Donn. Smith, Bot. Gaz. 57: 417. 1914. Santiago, near San Ramón, 1,000 meters, *Brenes 14507*. Known only from the region of the type. A shrub with pendent branches, the bark blackish; stipules thickened and spinose; leaflets 9–15, oblong, rounded at the apex, 4.5–7.5 long, tomentose on both sides; flowers 9 mm. long, in broad panicles, violaceous.

Machaerium floribundum Benth. Entre Río Jesús y Alto de La Calera de San Ramón, *Brenes 17133*. Extending to Colombia and British Guiana. A shrub or small tree, unarmed; leaflets about 10, large, elliptic-oblong, 7-12 cm. long, abruptly and shortly obtuse-acuminate, obtuse or rounded at the base, glabrous above, beneath green, minutely and sparsely sericeous or almost glabrous; flowers small, paniculate, both flowers and panicle branches densely and minutely brown-sericeous.

Machaerium marginatum Standl. Banks of Río Barranca, San Pedro de San Ramón, *Brenes 21871*. Widely distributed in Central America. A shrub, the trunk armed with large, stout spines; stipules large, in age indurate and spinose; leaflets about 13, oblong or oblong-elliptic, 8–13 cm. long, leathery, lustrous, conspicuously marginate, abruptly cuspidate-acuminate, nearly glabrous; flowers dirty pinkish white, 1 cm. long, in panicled racemes.

Machaerium Pittieri Macbride. *M. latifolium* Pittier, non Rusby. Forests of the Pacific coast. Ranging to southern Mexico. A tree or shrub; leaflets 3–5, glabrous, ovate or elliptic, acuminate, 6–14 cm. long; flowers in axillary racemes; samara 10–12 cm. long.

Machaerium Seemannii Benth. *M. campylocarpum* Donn. Smith, Bot. Gaz. 44: 109. 1907 (Hacienda Jiménez, Peñas Blancas,

Diquís Valley, *Pittier 12163*. Forests of the tierra caliente. Ranging to Colombia and British Honduras. A woody, unarmed vine; leaflets 7–11, ovate or lanceolate, acuminate, 1.5–5 cm. long, somewhat pubescent or almost glabrous; flowers 7 mm. long, purple, in axillary or terminal racemes; fruit 5–6 cm. long.

MEDICAGO L. Alfalfa

Medicago sativa L. *Alfalfa*. A forage plant, little cultivated in Costa Rica or elsewhere in Central America; an occasional weed in the temperate region. Imported from Europe.

MONOPLEGMA Piper

The genus consists of a single species.

Monoplegma trinervium (Donn. Smith) Piper. *Frijol de playa, Chumicos, Jaboncillos* (the seeds). *M. sphaerospermum* Piper, Journ. Wash. Acad. Sci. 10: 432. 1920 (Las Vueltas, Tucurrique, *Tonduz 12743*). Forests and thickets of the tierra caliente, ascending to 1,300 meters. Also in Guatemala. A large, woody vine, the stems as much as 10 cm. thick; leaflets 3, ovate, entire, 6–10 cm. long, acuminate, somewhat pubescent or almost glabrous; flowers in elongate racemes, probably purple, 1 cm. long; legume large, somewhat woody, dehiscent, 5–9 cm. long, 3–4 cm. wide; seeds usually 2, globose, black, 2 cm. in diameter.

MUCUNA Adans.

Plants scandent, herbaceous or woody; leaflets 3, large; flowers large, in short or greatly elongate, sometimes umbelliform racemes; standard shorter than the wings; fruit thick, linear or oblong, dehiscent, sometimes covered with irritant hairs.—A few other species are known from Central America.

Mucuna Andreana Micheli, Journ. de Bot. 6: 146. *pl. 5, 6*. 1892. *Ojo de buey*. Based in part upon Costa Rican specimens. Common in forests and thickets, Meseta Central to the coasts. Mexico to Colombia. A large, woody vine; leaflets large, softly pilose beneath; peduncles greatly elongate and pendent; legume about 18 cm. long and 4.5 cm. wide, densely sericeous, 3–4-seeded; seeds black, somewhat compressed, 3 cm. long. The name Ojo de buey refers to the appearance and form of the seeds.

Mucuna pruriens (L.) DC. *Pica-pica*. Abundant in thickets of the Pacific tierra caliente. A species of wide distribution in

tropical America. A herbaceous vine; leaflets pubescent; flowers 2–3 cm. long, purple or blue, in short racemes; pods 4–9 cm. long, 1 cm. thick, covered with long, stiff hairs. Of this species Pittier writes: "It grows naturally in cultivated ground of the Pacific tierra caliente, and the people do not destroy it, because of a belief that the plant is good for the soil. Since the velvet bean is one of the green manures recommended by scientific agriculturists, the coincidence is curious, to say the least." The pods of this plant are covered with reddish hairs which easily penetrate the skin, causing almost unendurable itching, hence the name pica-pica. In the West Indies, and perhaps elsewhere, these hairs, in sirup, formerly were administered, especially to the slaves, for the expulsion of intestinal parasites.

Mucuna urens (L.) DC. *Ojo de buey, Ojo de venado, Uña de tigre.* Common in thickets and forest, Meseta Central to the coasts, ascending sometimes to 1,800 meters. A species of wide distribution. A large, woody vine; leaflets almost glabrous; peduncles very long and pendent, the racemes umbelliform; flowers greenish or reddish, 4–5 cm. long; pods 8–20 cm. long, 5 cm. wide, covered with irritant hairs; seeds 3–4 cm. broad. The hairs of the pods are as disagreeable in their action as those of the preceding species. For this there are reported the following Indian names: Tsugi-kar (Cabécara); Kook-tsa-kúp (Brunka); Kuá (Térraba).

MYROSPERMUM Jacq.

The genus is represented in North America by only the following species.

Myrospermum frutescens Jacq. Isla de Caballo, *Brenes 15692.* Unknown elsewhere in North America, but occurring in Trinidad, Venezuela, and Colombia. A shrub or small tree; leaves pinnate, the leaflets 5–7 pairs, oblong or oval, obtuse to retuse at the apex, glabrous, with many pellucid lines; flowers white, tinged with pink, racemose; fruit samara-like, indehiscent, 1–2-seeded, extended below into a broad wing, 5–7 cm. long. The single Costa Rican collection is sterile, but it seems properly referable here.

The genus *Myroxylon* (*Toluifera* is a synonym) probably is represented in Costa Rica, but I have seen no specimens. From this tree there is extracted, chiefly in Salvador, the famous balsam of Peru (bálsamo del Perú).

NISSOLIA Jacq.

In Central America there is a single species, which is not at all a common plant.

Nissolia fruticosa Jacq.(?) *N. costaricensis* Donn. Smith, Bot. Gaz. 44: 108. 1907. Region of Nicoya; San Ramón. Mexico to Colombia. Plants small, scandent, woody; leaves pinnate, the leaflets usually 5, oval, 3–7 cm. long, obtuse; flowers yellow, 6 mm. long, in axillary racemes; fruit indehiscent, composed of a few disarticulating joints, terminated by a broad wing. *N. costaricensis* was based upon *Biolley 7088* from Surubres. and *Pittier 9664* from La Verbena. I have seen neither of these collections, but have little doubt that they are referable to *N. fruticosa*.

ORMOSIA Jackson

Two or three species of this genus are represented in Central America.

Ormosia panamensis Benth. Reported by Pittier from the mountains near Vijagual de Savegre, Pacific coast. Also in Panama. A tall tree; leaves pinnate, with few leaflets; flowers paniculate; pods dehiscent, constricted between the seeds, these red and black. It is not certain that the collection cited belongs properly to this species.

PACHYRHIZUS Rich.

Another species occurs in some parts of Central America.

Pachyrhizus erosus (L.) Urban. *Jícama*. Cultivated in many localities, and probably naturalized in some places. Native of Mexico. A herbaceous vine; leaflets 3, somewhat lobate or angulate, sericeous beneath; flowers violet, in elongate, axillary racemes; legume oblong, compressed, dehiscent. The plant is cultivated commonly in Central America and Mexico for its large, turnip-like roots, sometimes as large as a man's head. They are rather watery in consistency, but sweet and pleasant to eat. They always are eaten raw.

PAROSELA Cav.

Herbs or small shrubs, erect, usually with small but conspicuous glands on the leaves and branches; leaves pinnate, the leaflets small; flowers small, racemose or spicate; calyx 10-costate; fruit small, indehiscent, 1-seeded, generally shorter than the calyx.—There are other Central American species, principally in Guatemala. The

number of Mexican species is very large. Some authors use for the genus the name *Dalea*.

Parosela costaricana Rydb. N. Amer. Fl. 24: 77. 1920. *Alacrancillo, Gusanillo, Rabo de ratón.* Fincas of Zent and Guácimo, Atlantic plains, *United Fruit Company 21*. Common in pastures of the Meseta Central. Endemic. It is probable that the locality indicated for the type is erroneous, although it may be that the plant really does grow in the coastal region. An annual herb a meter or less in height, glabrous; leaflets 15–49, oblong, 4–8 mm. long; flower spikes 2–6 cm. long; calyx pilose; petals white or bluish. Pittier states that the plant appears to have emollient and sudorific properties. Specimens have been reported from Costa Rica under the name *Dalea alopecuroides* Willd.

Parosela emphysodes (Jacq.) Rydb. *Mata-pulgas, Pulguera. Dalea phymatodes* Willd. Dry places of the Pacific slope. Extending to Venezuela. A slender, branched shrub, the branches glabrous or somewhat pubescent; leaflets 9–13, almost glabrous, 6–10 mm. long; flowers spikes 1–2 cm. long, the flowers purple; calyx pilose.

Parosela lagopus Cav. *Dalea lagopus* Willd. Reported for Costa Rica, the locality not indicated. Extending to southern Mexico. A glabrous, annual herb; leaflets 21–51, 4–8 mm. long; flower spikes 2–10 cm. long, the flowers blue; calyx tube glabrous, the teeth pilose.

Parosela nutans (Cav.) Rose. *Dalea nutans* Willd. Hills of Nicoya. Ranging to Mexico. Plants perennial, slender, glabrous; leaflets 11–41, oblong, 5–10 mm. long; flowers purple, in small racemes.

Parosela robusta (Rydb.) Standl., comb. nov. *Dalea virgata* Micheli, Bull. Herb. Boiss. 2: 442. 1894, non Lag. *Thornbera robusta* Rydb. N. Amer. Fl. 24: 121. 1920. Near San José, *Pittier*. Meseta Central to the Pacific coast. Guatemala to Panama. A glabrous annual; leaflets 9–11, linear, 4–10 mm. long; flower spikes 2–5 cm. long, dense; calyx sericeous; flowers blue or purple.

PHASEOLUS L. Bean

Plants herbaceous, usually scandent; leaflets 3; flowers large or medium-sized, in axillary, short or elongate racemes; keel petal twisted twice to form a spiral; legume linear or oblong, compressed or subterete, dehiscent.—Other species grow in Central America.

Phaseolus adenanthus Meyer. *P. truxillensis* HBK. Thickets of the central region, extending to the coasts. A species of wide distribution. A large or small vine, pubescent or almost glabrous; leaflets ovate to lanceolate, 5–10 cm. long; flowers white and purple, 2–2.5 cm. long; legume linear, almost straight, 8–10 mm. wide.

Phaseolus anisotrichos Schlecht. Thickets of the Meseta Central; region of San Ramón. Ranging to Mexico. A pilose vine; leaflets small, broad, obtuse or acute; flowers small, purple; legume 2–3 cm. long, oblong, somewhat curved or almost straight. This species has been reported from Costa Rica under the name *P. leptostachyus* Benth.

Phaseolus atropurpureus DC. Buenos Aires, and probably elsewhere in the Pacific coast. Extending to Mexico and southwestern United States. A small vine, covered with white or gray hairs; leaflets narrow; flowers very dark purple; legume elongate and very narrow.

Phaseolus coccineus L. *Cubá.* Common in forests and thickets of the central region, also cultivated. Probably native of Mexico and Central America, but cultivated in many parts of the world for ornament or for its edible seeds. A large, pilose vine; leaflets large, broad, acute; flowers large, white, purple, or reddish, in very long racemes; legume large, compressed, oblong; seeds large, compressed, about 2 cm. long, brown, black, red, or white. If I am not mistaken, this species is the one cultivated so abundantly in the Cantón de Dota, where the seeds, called *cubaces*, occupy the place held elsewhere in Costa Rica by the common bean or frijol. Pittier refers the cubaces to *Phaseolus lunatus*, but the plants shown to me in the region of Santa María were rather *P. coccineus*. The plant has every appearance of being truly wild in Dota, and I believe that it is native in Costa Rica, and that its cultivation here is probably very ancient. I have been told that cubaces are almost unknown elsewhere in Costa Rica, and I do not remember having seen them in other parts of Central America, although in this memory may be at fault. Any one visiting Dota will become thoroughly acquainted with them, for they appear on the table at almost every meal. The wild plants are very showy and pretty, with their large, white or purple flowers. The cubaces, when cooked, have a flavor quite different from that of the common frijol, and a quite agreeable one.

Phaseolus gracilis Poepp. Reported from Costa Rica, the locality unknown. A species of wide distribution, in Central America

usually growing in savannas or other grassland. A small, almost glabrous vine; leaflets linear, obtuse, coriaceous; flowers few, purple, the peduncles much elongate. *P. longipedunculatus* Mart. var. *linearifoliolatus* Hassl., reported from Costa Rica (Guanacaste), seems to be merely a form of this species.

Phaseolus lunatus L. *Frijolillo.* Common in thickets, Meseta Central to the Pacific coast, and probably also the Atlantic. A species of wide distribution. A herbaceous vine; leaflets broad, acute, pubescent or almost glabrous; flowers white or purplish, small; legume 3–7 cm. long, 1–1.5 cm. wide, somewhat curved, compressed, broadest toward the apex. The wild form is common in many parts of Central America. There is also in cultivation another form, which has large, compressed seeds, white or variously colored, that are used in the same manner as the common bean. This is the lima bean, native of America, now grown for food in most regions of the earth.

Phaseolus obvallatus Schlecht. Central region. Extending to Mexico. Similar to *P. coccineus*, but the bractlets at the base of the calyx rounded and as broad as the calyx (in *P. coccineus* they are linear or oblong).

Phaseolus oligospermus Piper, Contr. U. S. Nat. Herb. 22: 698. 1926. Cartago, *Oersted.* Known only from the original collection. Leaflets ovate, acuminate, 3–5 cm. long, pubescent; flowers few, 12 mm. long, purple; legume linear, pilose.

Phaseolus peduncularis HBK. Common in thickets of the tierra caliente. Widely distributed in tropical America. A slender vine, somewhat pubescent or almost glabrous; leaflets ovate or lanceolate, acute; flowers small, greenish or lilac; legume narrowly linear, straight.

Phaseolus pilosus HBK. *P. hirsutus* Mart. Reported from the region of El General, determined by Morton. Honduras to Paraguay. A large, herbaceous vine, densely soft-pilose or sericeous throughout; leaflets broadly ovate or rhombic, obtuse or acute, often shallowly lobate; flowers bright yellow, 2.5 cm. long; fruit densely hirsute.

Phaseolus speciosus HBK. Region of San Ramón, at 1,050 meters; reported from El General. Extending to Mexico. A slender, herbaceous vine, sparsely pilose or glabrate; leaflets 3–5 cm. long, ovate-deltoid, obtuse or acute, thin; flowers 2–2.5 cm. long, the calyx broad, its lobes longer than the tube; fruit narrowly linear, long-

attenuate at the apex. The determination of the Costa Rican material referred here is questionable.

Phaseolus vulgaris L. *Frijol.* A plant of American origin, but unknown in a wild state; no doubt cultivated since the beginnings of American agriculture. Beans and maize are the basis of diet throughout Central America and Mexico. They are cultivated chiefly in temperate and cold regions, but also in the tierra caliente, for the dry seeds and the young, tender pods. In Costa Rica, as elsewhere, there are innumerable varieties, differing in shape and color of the seeds. A list of them is found in Pittier's *Plantas Usuales.* For this important plant there are reported only a few Indian names: Atu, Hatu (Bribrí); Kaní (Chirripó); Suep (Boruca).

Phaseolus xanthotrichus Piper. Cartago. Also in Guatemala. Leaflets ovate, obtuse, 2–3 cm. long, strigose; flowers few, 13 mm. long; legume linear, compressed, glabrous, 4 cm. long.

PLATYMISCIUM Vog.

Tall, almost glabrous trees; leaves pinnate, opposite, the leaflets few, large; flowers small, in axillary racemes, yellow; legume oblong, flat, indehiscent, 1-seeded.—Two other species are known from Central America.

Platymiscium pleiostachyum Donn. Smith, Bot. Gaz. 56: 54. 1913. *Nambar.* Hills near Nicoya, *Tonduz 13539.* Known only from the original collection. Leaflets 3, rounded, 5–8 cm. long; racemes fasciculate, the flowers almost sessile, 1 cm. long.

Platymiscium polystachyum Benth. *Quira.* Forests of the region of Boruca, and doubtless elsewhere. Nicaragua to Venezuela. A tall or medium-sized tree, the crown rounded, the bark gray and rough; leaflets 3 or 5, ovate, 5–20 cm. long; flowers pedicellate, 14 mm. long; fruit rounded at the apex, 9 cm. long, 3.5 cm. wide. The wood is reddish brown, sometimes striped, hard and heavy, of medium fine grain, and durable. It is employed locally for construction and cabinetwork, and is exported under the name Panama redwood, for making furniture and tool handles. Pittier reports the Indian names of Sinkrá (Brunka) and Zrok (Térraba).

POIRETIA Vent.

In Central America a single species is known.

Poiretia scandens Vent. Thickets, Meseta Central to the Pacific coast. Widely distributed in tropical America. A scandent

herb, glabrous; leaves pinnate, the 4 leaflets small, rounded or obovate, rounded at the apex; flowers small, yellow, in short, axillary racemes; legume linear, composed of few indehiscent joints.

PTEROCARPUS L.

Reference: Paul C. Standley, The Mexican and Central American species of *Pterocarpus*, Trop. Woods 28: 10. 1931.

Tall or medium-sized trees; leaves pinnate, the leaflets few, large, acuminate; flowers yellow, in axillary or terminal racemes or panicles; fruit samara-like, surrounded by a broad wing, usually 1-seeded.—From Central America there are known only these two species.

Pterocarpus Hayesii Hemsl. Forests of the Pacific tierra caliente. Panama to British Honduras. A tree 15–25 meters or more in height; leaflets large, lanceolate; flowers 1.5 cm. long, in axillary racemes, the calyx densely covered with short, brown hairs.

Pterocarpus officinalis L. *Chajada amarilla.* Forests of the coasts. British Honduras to the Guianas and West Indies. A tall tree; leaflets 6 or 8, oblong, lustrous; flowers paniculate, the calyx glabrous. Known in Nicaragua by the names Sangre, Sangre de drago, and Sangregado. The wood is white or whitish, not hard, light in weight, and of medium fine grain. The sap turns red when exposed to the air. The tree grows most profusely in periodically inundated lands, often in coastal swamps.

RHYNCHOSIA Lour.

Herbaceous or somewhat woody vines; leaflets 3, with minute glands on the lower surface, broad; flowers small or medium-sized, yellow or reddish, in elongate racemes; legume small, oblong, compressed, dehiscent, 1–2-seeded.—Other species grow in Central America.

Rhynchosia calycosa Hemsl. Pacific coast. Also in Panama. A large vine, the leaflets large, broad, pubescent or almost glabrous; calyx deeply lobate, the segments narrow, 3-nerved. Very similar to *R. longeracemosa.*

Rhynchosia ixodes Standl. Between Guachipelín and Volcán de La Vieja, Guanacaste, *Brenes 15543.* Panama to Yucatan. A small, slender, herbaceous vine, the stems densely glandular-pilose; leaflets ovate-deltoid, 1–2.5 cm. long, acute, densely viscid-pubescent on both surfaces; racemes mostly 3–7-flowered, the rachis

glandular-pilose; calyx 5 mm. long, the lobes twice as long as the tube; corolla 8–9 mm. long, reddish brown; fruit 16 mm. long, elliptic-oblong, viscid-hirsute and glandular.

Rhynchosia longeracemosa Mart. & Gal. Common in thickets and forests of the Meseta Central, also in the tierra caliente. Ranging to Mexico. A slender vine, the stems somewhat angulate; leaflets ovate, acuminate, densely pubescent, with conspicuous veins; flowers 8 mm. long, the standard purplish or reddish brown, the other petals yellow; calyx deeply lobate, the segments linear, 1-nerved; legume 2.5 cm. long and 1 cm. wide, pubescent, 2-seeded.

Rhynchosia minima (L.) DC. Thickets of the Pacific slope. Widely distributed in tropical America. A slender vine; leaflets small, broad, pubescent or almost glabrous; flowers greenish, 4–5 mm. long; legume 4 mm. broad, not constricted between the seeds; seeds very small, gray.

Rhynchosia pyramidalis (Lam.) Urban. Thickets of Guanacaste and region of San Ramón. Widely distributed in tropical America. Leaflets densely pubescent or almost glabrous; flowers greenish, 6–7 mm. long; calyx teeth short; legume 8 mm. wide, pubescent, constricted between the seeds. The seeds are scarlet and black and very handsome. In some regions they are employed for making bracelets, necklaces, and other articles.

Rhynchosia quercetorum Standl., sp. nov.—Volubilis, caulibus obtuse angulatis densissime pilosis; foliola saepe latiora quam longa, 3.5–5 cm. longa, 3–6 cm. lata, abrupte breviter acuta vel acuminata, basi truncata vel late rotundata, utrinque molliter breviter pilosa, subtus glandulis minutis conspersa; racemi densissimi multiflori longe pedunculati 5–6 cm. longi, bracteis lanceolatis dense viscido-pubescentibus longe acuminatis alabastris longioribus, floribus pedicellatis; calyx dense viscido-pilosus 6 mm. longus, lobis superioribus tubo paullo longioribus lineari-attenuatis, inferioribus brevibus triangulari-oblongis; vexillum intense rubro-purpureum extus pilosulum.—Oak (*Quercus*) forests, Santa María de Dota, Prov. San José, 1,600 meters, *Standley & Valerio 43431* (U. S. Nat. Herb., type). A herbaceous vine; leaflets very broad, densely pubescent; racemes short, dense, the bracts lanceolate, longer than the flower buds; calyx lobate to the middle, viscid-pubescent; standard dark purple or reddish, 1 cm. long.

Rhynchosia reticulata (Swartz) DC. In thickets, region of San Ramón, at 1,000–1,100 meters. Extending to Mexico and

West Indies. A stout, herbaceous vine, the stems acutely angulate, densely pilose with retrorse, whitish hairs; leaflets oblong to broadly ovate, acute or acuminate, densely pilose or appressed-pilose on both surfaces, more densely so beneath, conspicuously veined; racemes long and interrupted, the flowers as much as 1.5 cm. long, the linear, nerved, greenish sepals equaling the corolla; fruit oblong, densely pubescent.

SESBANIA Scop.

Other species occur in Central America.

Sesbania Emerus (Aubl.) Urban. Swampy places of the Pacific coast. Widely distributed in tropical America. An erect, glabrous herb of 1–2 meters; leaves pinnate, the leaflets 24–50, linear-oblong, 1.5–3 cm. long, rounded at the apex, pale; flowers in short, axillary racemes, 1.5–2 cm. long, yellow; legume narrowly linear, 20 cm. long, 4 mm. wide, straight, many-seeded.

STYLOSANTHES Swartz

Other species occur in Central America and probably also in Costa Rica.

Stylosanthes guyanensis (Aubl.) Swartz. Common in pastures and other grassy places, Meseta Central to the Pacific coast. A species of wide distribution. A small, perennial, erect or ascending herb, the stems 15–60 cm. long, pubescent; leaflets 3, linear-lanceolate, acuminate; stipules large; flowers small, yellow, in dense, terminal, bracted heads; fruit enclosed in the calyx, indehiscent, 1-seeded.

SWEETIA Spreng.

Only one species grows in Central America.

Sweetia panamensis Benth. *Carboncillo.* Forests of the Pacific tierra caliente. Panama to British Honduras. A medium-sized tree with rounded crown; leaves pinnate, the leaflets few, ovate or elliptic, 2.5–5 cm. long, obtuse, glabrous; flowers whitish, 5 mm. long, in axillary panicles; stamens free, exserted; legume flat, 5–7.5 cm. long, 2 cm. wide, 1–2-seeded. The tree is known in Panama by the name Malvecino, and in Salvador as Chichipate.

TEPHROSIA Pers.

Reference: Rydberg, N. Amer. Flora 24: 157. 1923.

Herbs, the leaves pinnate, the leaflets few or numerous; flowers small or medium-sized, racemose, the racemes terminal or opposite

the leaves; legume sessile, linear, compressed, dehiscent, with numerous seeds.—Other species occur in Central America.

Tephrosia decumbens Benth. Los Loros, Pacific coast, *Brenes 21464, 21465.* Yucatan to Colombia and Brazil. A small, perennial herb, the branches short-pilose with spreading hairs; leaflets 5–11, oblanceolate or cuneate, obtuse or retuse, 1–2 cm. long, grayish-sericeous; racemes few-flowered, the flowers 8–10 mm. long, purplish; fruit linear, 3–4 cm. long, 4 mm. wide.

Tephrosia Heydeana (Rydb.) Standl. Thickets of the Pacific tierra caliente, ascending to 1,100 meters; region of San Ramón. Panama to Guatemala. An erect herb a meter high or less, the stem pilose with spreading hairs; leaflets 21–29, oblong, rounded at the apex, 2–4 cm. long, sericeous; flowers 1.5 cm. long; calyx teeth longer than the tube, narrow, acuminate; legume 5–6 cm. long, 4 mm. wide. The plants of this genus are often employed in various regions of tropical America as fish poisons.

Tephrosia nicaraguensis Oerst. Plains of Guanacaste. Also in Nicaragua. Similar to the preceding species; leaflets 15–21; legume 4 cm. long.

Tephrosia nitens Benth. *T. nitens* var. *lanata* Micheli, Bull. Soc. Bot. Belg. 30, pt. 1: 286. 1891 (type from Costa Rica). Thickets and plains of the Pacific coast. Mexico to Brazil. Plants erect, a meter high or less; leaflets 9–13, oblong, rounded at the apex, thick, glabrous above, sericeous beneath; flowers pink, 2 cm. long; legume 5–6 cm. long, 5–6 mm. wide.

Tephrosia toxicaria (Swartz) Pers. Reported for the Pacific tierra caliente, but no specimens have been seen, and it is probable that the reports refer to *T. Heydeana* or *T. nicaraguensis.* A species of wide distribution in tropical America. Similar to the second and third species; leaflets 21–31, linear-oblong, 4–7 cm. long; flowers 1.5–2 cm. long; calyx teeth short and broad, acute; legume 5–7 cm. long, 5–6 mm. wide, 10–15-seeded.

TERAMNUS Swartz

A single species occurs in Central America.

Teramnus uncinatus (L.) Swartz. In thickets, Meseta Central to the Pacific coast. Widely distributed in tropical America. A scandent herb; leaflets 3, oblong or lanceolate, sometimes almost linear, 4–9 cm. long, pale and sericeous beneath; flowers small,

purple, remote, in long-pedunculate racemes; legume linear, 4–7 cm. long, 3–4 mm. wide, pilose with brown hairs.

TRIFOLIUM L. Clover

Annual or perennial herbs; leaflets 3, denticulate; flowers small, in dense heads or umbels; calyx teeth almost equal; fruit indehiscent, with 1 or few seeds, usually shorter than the calyx.—A few other species are known from Central America.

Trifolium amabile HBK. *Trébol, Acedera, Acedera de montaña.* Common in almost all pastures of the central region, abundant in pastures of the volcanoes, 1,100–2,000 meters. Mexico to the South American Andes. A prostrate or procumbent perennial, sparsely pubescent or almost glabrous; leaflets about 1 cm. long, obovate, emarginate; flowers purple or reddish, in small, pedunculate heads.

Trifolium dubium Sibth. *Mielilla.* Frequent in pastures of Turrialba and Irazú. A European species, naturalized in various parts of America. A slender, prostrate annual; flowers yellow, 2.5 mm. long. Doubtless introduced into Costa Rica with grass seeds.

Trifolium repens L. *Trébol blanco.* Naturalized in pastures of La Palma de San José, and in the region of Cartago. A European species, naturalized in many parts of temperate America. A slender perennial, prostrate and rooting at the nodes; flowers white or pink, the heads terminating long peduncles. White clover is planted extensively in temperate regions of North America for pastures and lawns. Doubtless it has been introduced into Costa Rica unintentionally, with grass seed.

ULEX L.

Ulex europaeus L. A few shrubs of this European plant are well established in pastures of Volcán de Poás, at an elevation of about 2,500 meters. A dense shrub a meter high, the short branches spine-like, sharp-tipped; leaves small, spiniform; flowers axillary, 1.5–2 cm. long, yellow.

VICIA L.

Vicia Faba L. *Haba.* The broad bean is cultivated sometimes in the region of Cartago for its large, edible seeds, utilized like beans. It is a European plant.

VIGNA Savi

Herbaceous vines, rarely erect plants; leaflets 3, broad; flowers clustered at the apex of an elongate, axillary peduncle, yellow;

calyx 4–5-dentate; legume linear, almost terete, dehiscent.—No other species are known from Central America.

Vigna repens (L.) Kuntze. *V. luteola* Benth. Thickets, Meseta Central to the Pacific coast. A species of wide distribution in tropical America. A slender vine, the stems sparsely pilose or glabrous; leaflets ovate to lanceolate, attenuate, almost glabrous; flowers yellow, 1.5 cm. long, few or numerous in the raceme; legume pilose, usually 3.5–4 cm. long.

Vigna unguiculata (L.) Walp. Sometimes cultivated for its young pods or for its seeds, both of which are edible, or as a green manure plant in banana and coffee plantations. A plant of African origin, the cow pea is grown upon a large scale in many temperate and tropical regions of the earth.

Vigna vexillata (L.) A. Rich. Thickets, Meseta Central to the coasts. A species of wide distribution in the tropics. Similar to *V. repens*, the stems hirsute with long, brown hairs; flowers yellow, 2–2.5 cm. long, usually 4 or fewer in a raceme; legume 7–10 cm. long.

ZORNIA Gmel.

A single species grows in Central America.

Zornia diphylla (L.) Pers. *Trencilla.* Grassy places or in thickets, Meseta Central to the Pacific coast. Widely distributed in tropical America. A perennial herb, erect or procumbent, about 30 cm. high; leaflets 2, ovate or narrower, acute, pilose or almost glabrous; flowers small, yellow, spicate, subtended by large, ovate, 2-ranked bracts; fruit articulate, composed of few compressed, indehiscent joints. Employed in Salvador as a remedy for dysentery.

GERANIACEAE. Geranium Family

Reference; Hanks & Small, N. Amer. Flora. 25: 3. 1907.

Herbs, the leaves opposite, often almost all basal, with stipules; flowers regular, in cymes; sepals 5, persistent, generally mucronate; petals 5, deciduous; stamens mostly 10, the filaments united at the base; fruit of 5 one-seeded carpels, the styles united with a central column.—The only genus native in Central America is *Geranium.*

GERANIUM L.

In Central America there is a single representative of the genus, but in Mexico there are numerous species.

Geranium mexicanum HBK. Common in forest and thickets of the central region, ascending the slopes of the mountains to 3,000 meters; San Ramón. Extending to Mexico. Plants perennial, ascending or decumbent, loosely branched, the few or numerous stems 20–60 cm. long, pubescent; leaves 5-angulate, petiolate, 3–5-parted, 1.5–4 cm. wide, the segments narrow, dentate, pubescent; pedicels glandular-pubescent; petals pink.

PELARGONIUM L'Hér. Geranium

Pelargonium graveolens L'Hér. *Geranio de olor, Malva de olor.* A plant of African origin, cultivated in gardens for its fragrant leaves, which are deeply lobate. Flowers large, pink. The English name is rose geranium.

Pelargonium hortorum L. H. Bailey. *Geranio.* An ornamental plant, very common in gardens. The cultivated geraniums are plants of artificial hybrid origin, obtained by crossing various African species. They are favorite house and garden plants in almost all parts of the earth.

OXALIDACEAE. Oxalis Family

Reference: R. Knuth, Pflanzenreich IV. 130. 1930.

Herbs or trees; leaves alternate, sometimes all basal, with or without stipules, compound, palmate or pinnate; flowers perfect, almost regular, in pedunculate, simple or compound cymes; sepals 5; petals 5; stamens 10; ovary 5-celled; fruit capsular or baccate, usually containing numerous seeds.—The genus *Biophytum* is represented elsewhere in Central America, and probably in Costa Rica.

AVERRHOA L.

Averrhoa Bilimbi L. *Tiriguro.* Cultivated and perhaps naturalized in Nicoya, and probably elsewhere. Native of the East Indies. A shrub or small tree; leaves pinnate, the leaflets numerous, ovate or oblong, acuminate, pubescent; flowers 1.5–2 cm. long, red-purple, in axillary or lateral cymes; fruit an oblong or globose berry, 6–9 cm. long, many-seeded. The fruits are eaten either raw or cooked with sugar.

OXALIS L.

Herbs, often acaulescent and with scaly bulbs; leaves pinnate or palmate, the leaflets 3 in the Costa Rican species; cymes few-flowered, the petals yellow or purple; fruit a small, narrow, angulate capsule.—Other species grow in Central America.

Oxalis Bradei Knuth, Repert. Sp. Nov. 23: 276. 1927. West slope of Volcán de Irazú, 2,100 meters, *Brade 2017*. Known to the writer only from description. Stems almost filiform, simple or branched, rooting; leaflets 3, broadly triquetrous-obcordate, 9 mm. wide and 6 mm. long, with a shallow, narrow sinus at the apex, glabrous above, pilose beneath; peduncles 1-flowered.

Oxalis corniculata L. *Acedera.* Common in pastures and other grassy places, or in thickets, Meseta Central to the Atlantic coast. A species of wide distribution. A slender, prostrate or procumbent, branched, pubescent herb; leaves palmately 3-foliolate, on long petioles, the leaflets small, obcordate; flowers small, yellow. This plant, like most other species, has an acid flavor. Pittier states that the country people give the leaves to small children to chew, since they believe them an effective remedy against intestinal parasites.

Oxalis latifolia HBK. Common in grassy places about San José. Mexico to Peru and West Indies. A small, succulent, acaulescent plant, the root bulbous; leaflets obtriangular, large, almost glabrous, the terminal lobes obtuse or subacute; flowers purple, 8–13 mm. long.

Oxalis Martiana Zucc. *Trébol.* Grassy places, Meseta Central to the Atlantic coast, sometimes a weed in cultivated ground; also cultivated for ornament. A species of wide distribution in tropical America, probably introduced in Costa Rica. Plants acaulescent, bulbous; leaves palmately 3-foliolate, succulent, the leaflets rounded, somewhat pubescent, the lobes broadly rounded at the apex; flowers purple 1.5–2 cm. long.

Oxalis Neaei DC. Common in thickets and savannas of the Pacific tierra caliente. Mexico to Brazil. A caulescent herb 10–50 cm. high, branched, pubescent; leaves pinnately 3-foliolate, the leaflets small, lanceolate to ovate, obtuse or emarginate; flowers yellow. The flowers are open in the morning but close about noon. Knuth reports for Costa Rica *O. pilosissima* Turcz. and *O. Berlandieri* Torr., which probably are mere forms of *O. Neaei.*

Oxalis rhombifolia Jacq. *O. acuminata* Schlecht. Reported for Costa Rica by Knuth, without indication of the locality (collected by Warscewicz). Mexico to Venezuela. An herb, perhaps sometimes frutescent, 1 meter high or less, branched; leaves pinnate, the 3 leaflets ovate or lanceolate, acuminate, somewhat pubescent; flowers yellow.

Oxalis vulcanicola Donn. Smith, Bot. Gaz. 23: 241. 1897. *Xanthoxalis vulcanicola* Small, N. Amer. Fl. 25: 55. 1907. Birrís, Volcan de Irazú, 2,800 meters, *Pittier 164*. Common in forest and at the edges of meadows of the central region, especially on slopes of the volcanoes, 1,300–3,000 meters. Also in Panama. A branched herb, procumbent or somewhat scandent, the stems dark red; leaves palmately compound, the 3 leaflets obovate or almost rounded, emarginate, pilose beneath; flowers yellow, the petals with red veins.

ERYTHROXYLACEAE. Coca Family

In America the family is represented by a single genus.

Reference: O. E. Schulz, Pflanzenreich IV. 134. 1907; N. L. Britton, N. Amer. Flora 25: 59. 1907.

ERYTHROXYLON L.

Glabrous trees or shrubs; leaves alternate, with stipules, petiolate, entire; flowers small, pedicellate, solitary or fasciculate in the leaf axils; calyx 5-lobulate or of 5 sepals, persistent; petals 5, small; stamens 10, biseriate, united near the base to form a tube; ovary 3-celled; fruit a drupe, usually with a single cell and seed.—Other species occur in Central America. *E. Coca* Lam., a Peruvian species, from which is extracted the narcotic drug cocaine, probably is planted in some Costa Rican gardens. It is cultivated extensively in the Andes, even as far north as Colombia.

Erythroxylon havanense Jacq. *E. havanense* var. *continentis* Schulz, Pflanzenreich IV. 134: 92. 1907 (Nicoya, *Tonduz 13886*). Dry thickets of Guanacaste. Ranging to Cuba and Ecuador; known in Costa Rica only from the collection cited. A shrub or small tree; leaves short-petiolate, the petioles twice as long as the stipules, the blades elliptic, obtuse; pedicels 4.5–6.5 mm. long; petals 5 mm. long, white; drupe 4.5–7 mm. long.

Erythroxylon lucidum HBK. *E. costaricense* Donn. Smith, Bot. Gaz. 23: 240. 1897 (Santo Domingo de Golfo Dulce, *Tonduz 10092*). *E. lucidum* var. *costaricense* Schulz, Pflanzenreich IV. 134: 25. 1907. Forests and thickets of the Pacific slope. Mexico to Peru. A shrub or small tree; stipules twice as long as the petioles; leaves elliptic or obovate, 7–14 cm. long, acute; pedicels 1–10 mm. long; petals white, 3–4.5 mm. long; drupe 5–7.5 cm. long. The var. *costaricense* has slightly smaller flowers than the typical form.

TROPAEOLACEAE. Nasturtium Family

References: Buchenau, Pflanzenreich IV. 131. 1902; Nash, N. Amer. Flora 25: 89. 1910.

The family consists of a single genus.

TROPAEOLUM L. Nasturtium

Annual or perennial herbs, usually scandent, sometimes with tuberous roots; leaves alternate, peltate, entire, angulate, or lobate; flowers very irregular, perfect, solitary in the leaf axils; sepals 5; petals 5, one of them spurred; stamens 8, free; ovary 3-celled; fruit indehiscent, somewhat fleshy.

Tropaeolum bimaculatum Klotzsch ex Buchenau, Bot. Jahrb. 15: 217. 1893. Based upon collections made by Warscewicz on the volcanoes of Chiriquí and Irazú. Forests of the central volcanoes, 2,800–3,000 meters. Also in Panama. Plants scandent, glabrous; leaves 3–4 cm. broad, somewhat lobulate, the lobes rounded; flowers almost 3 cm. long, the upper petals dentate.

Tropaeolum majus L. *Capuchina.* An ornamental garden plant, of South American origin. The English name is nasturtium.

Tropaeolum Moritzianum Klotsch. Common in wet forests of the central mountains, 800–3,000 meters; region of San Ramón. Guatemala to Venezuela. A glabrous vine; leaves 4–10 cm. wide, entire or somewhat lobulate, almost orbicular; flowers dark red, the petals dentate. A very handsome plant because of its brilliantly colored flowers. It grows profusely in some localities on the slopes of Irazú, often in association with *Impatiens turrialbae.* The flowers of these two plants are exactly alike in color, and confusingly alike in form, and I have found them twisted together in such a manner that it was difficult to distinguish them.

Tropaeolum pendulum Klotzsch. Mountain forests of the central region, 1,500–2,800 meters. Ranging to Colombia. A small, glabrous vine, the leaves rounded, somewhat lobulate; flowers yellow, the petals entire or merely crenulate.

Tropaeolum Warscewiczii Buchenau, Bot. Jahrb. 26: 582. 1899. Type collected in Costa Rica or in Veraguas, Panama, by Warscewicz; a little known species. Plants scandent, glabrous; leaves somewhat 5-lobulate; flowers 3.5–4 cm. long, the petals pale yellow, the upper ones dentate.

ZYGOPHYLLACEAE. Lignum-vitae Family

Reference: Vail & Rydberg, N. Amer. Flora 25: 103. 1910.

Other genera represented in Central America are *Guaiacum* and *Tribulus*.

KALLSTROEMIA Scop.

Annual or perennial herbs, usually procumbent or prostrate, pubescent; leaves stipulate, pinnate, opposite; flowers axillary, solitary, yellow; sepals 5; petals 4–6; stamens 10–12; ovary 8–12-celled; fruit of 8–12 hard, dry, beaked, 1-seeded carpels united with a central column.—From Central America only the following species are known.

Kallstroemia caribaea Rydb. Reported for Costa Rica, the locality not indicated. Yucatan to Venezuela and the West Indies. Similar to the following species, but the fruit strigose.

Kallstroemia maxima (L.) Torr. & Gray. *Talcacao. Tribulus maximus* L. Waste ground of the Pacific coast, and probably in other regions. A species of wide distribution. Plants annual, branched; leaflets 3 or 4 pairs, oblong or oval, 5–20 mm. long; petals 8 mm. long; fruit glabrous, 10-carpellate. Pittier states that in Nicoya the crushed leaves are applied to boils and similar sores, to bring them to a head.

RUTACEAE. Rue Family

Reference: P. Wilson, N. Amer. Flora 25: 173. 1911.

Trees or shrubs, rarely herbs, with glands in the bark, leaves, and fruits; leaves alternate or opposite, pellucid-glandular, without stipules, pinnate or digitate, rarely simple; flowers perfect, polygamous, or dioecious; calyx with 3–5 lobes or sepals; corolla of 3–5 petals; ovary 1–5-carpellate, the carpels sessile or stipitate, free or united, usually with 2 ovules in each cell; fruit follicular or capsular, or a samara, drupe, or berry.—Other genera are represented in Central America.

AMYRIS L.

Shrubs or trees, unarmed; leaves opposite or alternate, trifoliolate or sometimes 1-foliolate, petiolate; inflorescence paniculate, few- or many-flowered, the flowers perfect, white or whitish; sepals 4 or 5, the petals of the same number, the stamens twice as many; ovary 1-celled, the style very short, terminal, the stigma flat or capitate; fruit a small or large drupe.—Two other species are known from Central America.

Amyris Brenesii Standl., sp. nov.—Ramuli teretes minute sparseque griseo-puberuli vel glabrati, lenticellis numerosis pallidis conspersi, internodiis elongatis; folia magna alterna 8–11 cm. longe petiolata chartacea, petiolo gracili tereti glabro; foliola 3 et 1.5–4 cm. longe petiolulata in sicco subfusca lanceolato-oblonga vel ovato-oblonga 15–21 cm. longa 5.5–7 cm. lata attenuato-acuta, basi obtusa, dense pellucido-punctata, supra glabra sublucida nervis venisque prominulis, subtus sparse minutissime puberulis vel fere omnino glabra, costa gracili elevata; paniculae numerosae angustae foliis aequilongae vel breviores pedunculatae laxe ramosae, ramis oppositis minute griseo-puberulis, bracteis latissime ovatis persistentibus ca. 1 mm. longis, pedicellis vix ultra 1 mm. longis; sepala latissime ovata obtusa ca. 0.8 mm. longa pallida; ovarium sessile glabrum basi et apice paullo constrictum, stigmate capitato.—San Pedro de San Ramón, July, 1932, *Brenes 16170* (type in Herb. Field Mus.). In foliage the plant is suggestive of some species of *Casimiroa*, but it is apparently referable rather to the genus *Amyris*.

Amyris costaricensis Standl., sp. nov.—Arbuscula 2–3-metralis omnino glabra, ramulis gracilibus ochraceis subteretibus lenticellis numerosis parvis pallidis conspersis; folia subopposita vel alterna magna longipetiolata crasse membranacea, petiolo gracili ad 18 cm. longo gracili tereti; foliola 3, lateralia 1 cm. longe terminalia 4 cm. longe petiolulata, elliptica vel oblongo-elliptica 17–21 cm. longa 8–10.5 cm. lata apice obtusa et abrupte breviter apicata, basi rotundata vel obtusa, supra in sicco viridia nervis venisque gracillimis prominulis, sublucida, subtus multo pallidiora, costa gracili elevata, venulis prominulis laxe reticulatis; panicula parva ca. 5 cm. longa breviter pedunculata multiflora, floribus breviter pedicellatis; drupa ovalis vel ovoidea basi et apice rotundata 1.5–2 cm. longa 1-sperma. —Forests of La Palma (Piedades) de San Ramón, 1,000 meters, January, 1927, *Brenes 5362* (type in Herb. Field Mus.). Because of the incomplete state of the material, the generic reference of this plant is uncertain, but it appears referable here more satisfactorily than elsewhere.

Amyris sylvatica Jacq. Forests of the Meseta Central, and perhaps elsewhere. Mexico to Colombia and West Indies. A small, glabrous tree; leaves alternate or subopposite, the 3–5 leaflets ovate, 3–10 cm. long, acuminate, somewhat crenate; flowers small, white, in terminal panicles, the petals 3 mm. long; fruit a globose drupe 5–7 mm. long, black or reddish. The wood is yellowish or whitish, very hard and heavy, fragrant, and brittle.

CASIMIROA Llave & Lex.

Two other species are known from Central America.

Casimiroa tetrameria Millsp. *Matasano.* Tierra templada of the central region, cultivated and also wild in the forests. Ranging to southern Mexico. A large or medium-sized tree with rounded crown; leaves alternate, digitate, the leaflets mostly 5, elliptic, acuminate, 7–16 cm. long, densely and softly pilose; flowers small, whitish; fruit a large berry, resembling a green or yellow apple, very juicy, sweet, the flesh white. The tree flowers and fruits throughout the year. The fruit has an agreeable flavor, somewhat suggestive of a sweet apple, but there is a popular belief that it is "unhealthy" if much eaten, and that it causes drowsiness. There is probably a scientific basis for the latter belief. The wood is white. Costa Rican collections have been referred to *C. Sapota* Oerst. and *C. edulis* Llave & Lex., but I have seen no Costa Rican specimens of these species.

CITRUS L.

All the species of this important genus are natives of the Old World, principally of China and the East Indies.

Citrus aurantifolia (Christm.) Swingle. *Limón. C. Limetta* of many authors. A small tree, cultivated from sea level to 1,400 meters, also naturalized in many places, especially in the tierra caliente, where it is sometimes abundant in forests. The small, acid fruits of the lime are used for preparing refreshing beverages and conserves.

Citrus Aurantium L. *Naranjo ácido, Naranjo agrio.* Planted in many places, and perhaps also naturalized. The fruits of the sour orange are very acid and bitter, and not edible. The juice and rind are used for preparing certain kinds of preserves.

Citrus grandis (L.) Osbeck. *Toronja. Grapefruit.* Planted in some places, especially in the Atlantic tierra caliente, and producing fruit of good quality. Because of its acidity, the grapefruit has few friends among Central Americans.

Citrus Limonia Osbeck. *Limón real.* The lemon is planted in some localities, but it is not a common fruit of Central America, the lime being preferred for the purposes for which the lemon is employed in the North.

Citrus Limetta Risso. *Lima, Lima dulce.* Much grown for its large, sweet fruits. To the writer this seems one of the poorest

of all tropical fruits, its flavor suggesting nothing so much as slightly sweetened, warm dishwater.

Citrus medica L. *Cidra, Toronja.* Sometimes planted for its large fruits, similar to the grapefruit, but with a very thick rind that is utilized for preparing conserves.

Citrus nobilis Lour. var. **deliciosa** (Ten.) Swingle. *Mandarina.* The tangerine is planted rather commonly in the Meseta Central, and probably in other regions.

Citrus sinensis (L.) Osbeck. *Naranjo, Naranja dulce.* The sweet orange doubtless was imported into Costa Rica in earliest colonial days from Spain, and now is grown everywhere from sea level to at least 1,500 meters. It thrives better in mountain regions. The oranges of Costa Rica are often of superior quality, and they have been exported in small quantities in past years. The navel oranges are grown in some localities, those of Navarro being famous throughout the country. There can be no dispute that tropical oranges, such as those produced in Costa Rica, are greatly superior in flavor and sweetness to those cultivated under rather artificial conditions in the North. Among Indian names reported are: Ash, Ash-uó (Bribrí); Nemar-ue, Tshina-rí (Cabécara); Tshina, Tshina-ue (Chirripó); Drah tshina (Brunka); Kikure (tree), Kamum (fruit; Guatuso).

ERYTHROCHITON Nees & Mart.

A single species is known from North America.

Erythrochiton Lindeni (Baill.) Hemsl. Forests of the Pacific tierra caliente. Ranging to southern Mexico. A glabrous shrub or small tree; leaves with a single leaflet, this elliptic or oblanceolate, 25–35 cm. long, acuminate, entire; flowers in small, pedunculate cymes, the sepals 3–4 cm. long; petals united to form a tube; fruit a 5-celled capsule.

ESENBECKIA HBK.

Another Central American species is found in Guatemala and British Honduras.

Esenbeckia litoralis Donn. Smith, Bot. Gaz. 23: 242. 1897. Bahía de Salinas, *Pittier 2777.* Also in Salvador. A shrub or small tree; leaves alternate, the 3 leaflets elliptic, 5–12 cm. long, rounded or short-acuminate at the apex, somewhat pilose beneath; flowers 5 mm. broad, in small, terminal panicles; fruit capsular.

MURRAYA Koenig

Murraya paniculata (L.) Jack. *Mirto. M. exotica* L. An ornamental shrub or small tree, cultivated occasionally. Native of the East Indies. Leaves pinnate, the 3–9 leaflets small, obovate, obtuse; flowers small, white; fruit a globose, red berry 1–1.5 cm. long.

PELTOSTIGMA Walp.

A single species is known from North America.

Peltostigma pteleoides (Hook.) Walp. Summit of Cerro de La Carpintera, 1,800 meters. Ranging to southern Mexico, and in Jamaica. A small, glabrous tree; leaves petiolate, digitate, the 3–5 leaflets elliptic or obovate, 5–20 cm. long, acute or acuminate, entire or crenulate; flowers white, with the odor of orange blossoms, 3–3.5 cm. broad, few, in axillary cymes, the petals rounded, puberulent; fruit a globose capsule.

RAVENIA Vell.

Only one species is known in Central America.

Ravenia rosea Standl. Forests of the Atlantic coast. Also in Nicaragua. A shrub of 2–2.5 meters or a small tree; leaves opposite, simple, short-petiolate, oblong or oblanceolate, 16–25 cm. long, narrowly acuminate, almost glabrous; flowers few, terminal, pedicellate, pink, 4 cm. long; fruit composed of few carpels. The wood when first cut is yellowish white.

RUTA L. Rue

Ruta chalapensis L. *Ruda.* Rue is cultivated commonly in gardens, an importation from Europe. An aromatic, perennial herb with pale green foliage. The plant rarely flowers in Central America. It is much used in domestic medicine as a sudorific and vomitive.

TRIPHASIA Lour.

Triphasia trifolia (Burm.) P. Wilson. An ornamental shrub, planted in some localities. Native of the East Indies. Branches armed with axillary spines; leaves alternate, the 3 leaflets ovate or oval, 1–3.5 cm. long, obtuse; flowers in small cymes, white, fragrant, 1.5 cm. long; fruit a globose berry 1–1.5 cm. in diameter, red and aromatic, 1–3-seeded.

ZANTHOXYLUM L.

Trees or shrubs, generally armed with prickles, these often large and greatly thickened, the bark aromatic; leaves alternate, pinnate, rarely with a single leaflet, the leaflets opposite or alternate, entire or crenulate, with pellucid glands; flowers small, whitish or yellowish, in terminal or axillary panicles or clusters, the sepals 3–5, generally somewhat united; fruit of 1–5 follicles.—Other species are known from Central America. In some species the trunk is covered with short, pyramidal prickles almost cork-like in texture. It is possible to separate them from the bark, with a flat basal surface, on which there are sometimes cut letters or figures, the seal so produced being used for printing figures on paper or cloth. The wood in this genus is yellow, hard, and heavy.

Zanthoxylum chiriquinum Standl., sp. nov.—Frutex glaber inermis; folia petiolata, petiolo 2–5 cm. longo; foliola 7–9 oblonga vel elliptico-oblonga 4–7.5 cm. longa 1.5–3 cm. lata obtusa vel breviter acutata, basi acuta vel abrupte contracta, crenata vel subintegra, subcoriacea, petiolulata, subtus paullo pallidiora, conspicue glanduloso-punctata, floribus viridescentibus, pedicellis 2–3 mm. longis crassis; sepala 5 ovata acuta vix 1 mm. longa; petala 3.5–4 mm. longa; folliculi 1–2 oblique subglobosi 7 mm. longi crasse stipitati, seminibus subglobosis nigris lucidissimis.—Río Ladrillo, above El Boquete, Chiriquí, Panama, 1,200 meters, *Pittier 3060* (type in Herb. Field Mus.). From Costa Rica I have seen the following collections: Laguna de La Escuadra, near El Copey, 2,000 meters, *Standley 42042;* near Los Lotes, north of El Copey, 2,100–2,400 meters, *Standley 42647;* Cerros de Zurquí, northeast of San Isidro de Heredia, 2,000–2,400 meters, *Standley & Valerio 50619.* A glabrous shrub 2–3 meters high; leaflets 7 or 9, oblong, obtuse or acute, crenulate; panicles equaling the petioles, pedunculate, composed of few pedicellate flowers; sepals and petals 5.

Zanthoxylum elephantiasis Macfad. *Lagartillo.* Forests of the Meseta Central and Guanacaste; San Ramón. Ranging to Mexico and West Indies. A tree of 6–15 meters, the trunk armed with short, thick prickles, the crown rounded; leaflets 5–17, ovate or oblong, 4–10 cm. long, acute or acuminate, crenulate, glabrous; panicles terminal or axillary, with very thick branches; sepals and petals 5; follicles 5, stipitate, 7–9 mm. long. Easy to recognize by the very thick branches of the panicles.

Zanthoxylum ferrugineum Donn. Smith, Bot. Gaz. 24: 391. 1897. Alajuela, 900 meters, *J. D. Smith 6468*. Known only from the original collection. An unarmed tree with grayish bark, the young parts covered with a brown tomentum that disappears when the leaves are fully developed; leaflets 13–17, oblong, 4–6.5 cm. long, acuminate, crenate or almost entire; panicles 6–10 cm. long; petals 9 or 10; follicle 1.

Zanthoxylum insulare Rose. *Lagartillo*. Forests of Guanacaste. Mexico to Jamaica and northern South America. A tree of 6–12 meters, the trunk very prickly, the crown broad; leaflets 7–15, oblong, 2–7 cm. long, obtuse, crenate, glabrous, somewhat blackish when dried; panicles axillary, very short; sepals and petals 4; follicles 1 or 2, stipitate or almost sessile, 5–7 mm. long.

Zanthoxylum Limoncello Planch. & Oerst. *Limoncillo, Zorrillo. Z. costaricense* Donn. Smith, Bot. Gaz. 12: 190. 1888 (near Cartago, *Cooper 176*). Common in hedges of the Meseta Central. Panama to Mexico. A densely branched, very prickly shrub of 2–5 meters, almost glabrous; leaflets 3, oblong-elliptic, acute, 3–7 cm. long, crenulate or almost entire; sepals and petals 4; follicles 1 or 2, stipitate or almost sessile, 5–7 mm. long. All parts of the plant have a strong and characteristic odor that suggests lemon.

Zanthoxylum melanostictum Schlecht. & Cham. *Lagarto colorado*. In forest, region of San Ramón, collected only by Brenes. Extending to Mexico. A tree, the smooth, gray bark with scattered, large, conical prickles, the branches armed or unarmed; leaflets 3–7, oblong to elliptic or oblong-obovate, 6–12 cm. long, obtusely short-acuminate to rounded at the apex, coriaceous, entire or crenulate, glabrous; panicles axillary and terminal, lax, 5–10 cm. long; sepals 5; follicles 1–5, obovoid, 6–7 mm. long.

Zanthoxylum microcarpum Griseb. *Lagartillo, Lagarto blanco*. Thickets of the Meseta Central; San Ramón. Ranging to southern Mexico and West Indies. A shrub or tree of 3–6 meters, the trunk very prickly; leaflets 11–20, oblong, 3–9 cm. long, acute or obtuse, crenate, the scant pubescence of minute, stellate hairs; panicles terminal, 10–15 cm. long; sepals and petals 5; follicles 1 or 2, about 4–5 mm. long. The species may be recognized by the stellate hairs.

Zanthoxylum monophyllum (Lam.) P. Wilson. *Lagarto negro, Lagarto amarillo*. Near San José and at San Ramón. Also West Indies and northern South America. A prickly shrub or small

tree, 4–8 meters high, almost glabrous; leaflet only 1, oval or elliptic, 5–15 cm. long, acute or rounded at the apex; panicles terminal or lateral, 2–5 cm. long; sepals and petals 5; follicles 2 or 3, mostly 3.5–4.5 mm. long. Because of its single leaflet, this species is very unlike other local representatives of this genus.

Zanthoxylum panamense P. Wilson. *Lagarto blanco.* Panama. A tree sometimes 20 meters high, with a trunk 40 cm. in diameter, this armed with broad, hard, corky prickles, the branches more or less prickly or sometimes unarmed; leaflets 6–8, oval-oblong to oval, 8–14 cm. long, rounded and mucronate at the apex or sometimes abruptly short-acuminate, somewhat puberulent beneath or glabrate, subcoriaceous, entire; panicles 20–25 cm. long, minutely hispidulous or glabrate; sepals and petals 5; follicles subglobose, 4–5 mm. long.

Zanthoxylum procerum Donn. Smith, Bot. Gaz. 23: 4. 1897. *Lagartillo, Palo de lagarto.* Santa María de Dota, 1,170 meters, *Tonduz 2348.* Common in forests of the central region, and extending to both coasts, ascending to 1,700 meters. Ranging to southern Mexico. A tree of 5–15 meters, somewhat prickly, almost glabrous; leaflets 4–12, oblong to oval or obovate, 7–15 cm. long, acuminate, crenate or entire; flowers white, in terminal corymbs; sepals and petals 3; follicle 1, usually 5.5–7 mm. long. Indian names are Norí (Bribrí) and Ku-krá (Brunka).

SIMARUBACEAE. Simaruba Family

Reference: J. K. Small, N. Amer. Flora 25: 226. 1911.

Trees or shrubs; leaves mostly alternate and pinnate, the leaflets entire, rarely dentate, mostly alternate; flowers perfect or of 2 sexes, small, paniculate or clustered in the leaf axils; sepals 3–7, distinct or united; petals 3–7; stamens as many as the sepals or twice as many; ovary of 2–5 distinct or united carpels, these 1–2-ovulate; fruit a drupe, berry, capsule, or samara.—All the known Central American genera are represented in Costa Rica.

ALVARADOA Liebm.

A single species grows in Central America. The genus was named for Pedro de Alvarado, associate of Cortés and conqueror of Guatemala and Salvador.

Alvaradoa amorphoides Liebm. Diquís Valley. Ranging to Mexico, Florida, and the West Indies. A shrub or small tree;

leaflets 19–51, oblong, 1–2.5 cm. long, rounded at the apex, glabrous above, pubescent beneath; flowers small, dioecious, in bracted racemes, apetalous; fruit a winged samara, lanceolate or oblong, acute, 1–1.5 cm. long, pilose.

PICRAMNIA Swartz

Slender trees or shrubs; leaflets few or numerous, entire; flowers small, green, dioecious, in elongate spikes which are simple or branched; petals and sepals 3–5; stamens 3–5; fruit a 1–2-seeded berry.—One or two other species are found in Central America.

Picramnia carpinterae Polak. Linnaea 41: 553. 1877. *Caregre.* Forests of Cerro de La Carpintera, *Polakowsky.* Common in forests of the whole central region, 1,000–1,800 meters. Also in Panama. A shrub or small tree of 2–6 meters; leaflets about 11, ovate or elliptic-oblong, obtuse-acuminate, soft-pubescent beneath, at least on the veins, which are very conspicuous; staminate flowers in very long and slender spikes, the pistillate racemes elongate; berries bright red, 1.5 cm. long. The shrub is a handsome and ornamental one when loaded with its beautiful fruits. Costa Rican collections have been referred to *P. antidesma* Swartz. Small listed *P. carpinterae* as a synonym of *P. latifolia*, which is certainly an error. The leaves are somewhat yellowish when dried.

Picramnia latifolia Tulasne. Common in forests of the Atlantic coast, also in the Pacific tierra caliente; region of San Ramón. Extending to Colombia. A shrub or small tree; leaflets few, ovate or elliptic, 6–15 cm. long, narrowly acuminate, almost glabrous; racemes simple; sepals 5; fruits red. The species may be recognized by its large leaflets.

Picramnia longifolia Standl. Journ. Wash. Acad. Sci. 17: 312. 1927. Forests of Cerro de Las Caricias, north of San Isidro, Prov. Heredia, 2,400 meters, *Standley & Valerio 52211.* Known only from the region of the type. A shrub of 3 meters; leaflets 17–21, ovate to oblong, 3–4.5 cm. long, acuminate, puberulent beneath on the costa, glabrous elsewhere; pistillate inflorescence branched, the staminate simple; sepals 4; berries dark red, 1 cm. long.

Picramnia quaternaria Donn. Smith. *Caregre, Sartalillo.* Common throughout the central region, in forests and hedges, also in Guanacaste. Extending to Guatemala. A shrub of 2–5 meters; leaflets 9–15, ovate to oblong, mostly 3–6 cm. long, acuminate,

almost glabrous; inflorescences of both sexes simple; berries red, or black when perfectly mature. The name Urruca is sometimes given to this shrub, but probably in error, because of confusion with *Trichilia*. The plant is abundant in hedges of the Meseta Central, where the branches with fruits are often employed for decorating altars and houses.

QUASSIA L.

A single species grows in Central America.

Quassia amara L. *Hombre grande, Hombrón, Guavo.* Forests of the tierra caliente. Mexico to northern South America. A shrub or small tree; rachis of the leaf winged, the leaflets 5, opposite, oblong or obovate, 5–10 cm. long, glabrous; flowers bright red, 3 cm. long, in elongate racemes; fruit of 5 black drupes 1–1.5 cm. long. The shrub is a highly ornamental one in the dark forests that it inhabits, because of its large and vividly colored flowers. All parts of the plant are as bitter as quinine, and it has long been employed in the same manner. Pittier writes: "It is one of the principal remedies of the Indians. They cut the trunk into pieces 30–60 cm. long, one of which they always carry upon their voyages, and which they sometimes carry for sale to the markets of the interior. For fevers and as an aperitive they take an infusion of shavings from one of these sticks." The plant furnishes quassia of commerce, employed in the preparation of insecticides and proprietary medicines. Small (N. Amer. Flora) states that the species is "cultivated and locally naturalized" in Mexico and Central America. I can not guess at the data upon which so ridiculous a statement was based, since the plant is one of the conspicuous elements of the virgin forest.

SIMABA Aubl.

A single species grows in Central America.

Simaba Cedron Planch. *Cedrón.* Golfo Dulce. Ranging to Colombia. A shrub or small tree of 4–8 meters, terminated by a cluster of huge leaves; leaflets numerous, oblong or lanceolate, 10–20 cm. long, acuminate, entire, glabrous; flowers perfect, 2.5–3.5 cm. long, in large panicles; fruit an oval drupe about 10 cm. long. A bitter plant, having a high reputation in Central America as a remedy for fevers and snake bites. The part used is the cotyledons of the seeds, which are said to be exported in small quantities from Puntarenas.

SIMARUBA Aubl.

A single species is known in Central America.

Simaruba glauca DC. *Olivo.* Dry forests of the Pacific coast; El General. It is abundant along the Pacific coast of Central America. A medium-sized tree; leaflets 11–21, oblong, 5–10 cm. long, obtuse, glabrous, very pale beneath; flowers small, whitish, in large panicles; drupes oval, 2 cm. long, white or black. The fruits, in appearance much like ripe olives, are edible. The pulp is astringent, somewhat sweet or insipid, and not very appetizing. In other parts of Central America the tree is known by the names Aceituno and Jucumico. The wood is yellowish white, light in weight, and not durable.

BURSERACEAE. Torchwood Family

Reference: Rose, N. Amer. Flora 25: 241. 1911.

Aromatic shrubs or trees; leaves alternate, without stipules, pinnate, the leaflets few, entire or dentate; flowers small, generally perfect and paniculate; sepals 3–5, united at the base; petals 3–5, alternate with the sepals; stamens 6–10, the filaments free; ovary superior, 4–5-celled, the cells 2-ovulate; fruit drupaceous, 1–5-seeded.—The genus *Tetragastris* is represented in Central America and probably in Costa Rica, although I have seen no collections from the country.

BURSERA P. Br.

Trees or shrubs, the leaves deciduous, pinnate in the Central American species, the leaflets entire or crenate; flowers small, solitary or in axillary panicles; petals imbricate; fruit a small, 3-angled drupe, dehiscent, containing a single large seed.—At least one other species is known from Central America. The genus is most abundantly represented in Mexico.

Bursera graveolens (HBK.) Triana. *Caraña.* Isla de Caballo, *Brenes 15697.* Yucatan to Peru. A small tree; leaflets 5–7, membranaceous, glabrous in age, lance-oblong, long-acuminate, coarsely crenate, the rachis broadly winged.

Bursera Simaruba (L.) Sarg. *Jiñote, Almácigo* (Limón), *Caraña.* Meseta Central to the coasts. Mexico to Colombia and Florida. A small or sometimes a very large tree, the trunk thick, the bark reddish, constantly renewed and peeling off in large, paper-like sheets; leaves deciduous, the leaflets 3–11, ovate or elliptic,

acuminate, glabrous or somewhat pubescent; flowers small, whitish; fruit dehiscent, 3-angulate, 1 cm. long. In some parts of Central America this tree receives the descriptive name of Indio desnudo, in allusion to the appearance of the trunk, which in a dark forest often startles one by its resemblance to the bronzed body of an Indian. The trunk and branches exude a gum known as Elequeme or Tacamahaca, which is considered an efficient remedy for venereal diseases and chronic ulcers. The tree is planted commonly for living fence posts. The gum is employed also for mending broken dishes, and by the Indians of some regions for protecting their canoes against insect attacks. The wood is whitish or pale brown, light in weight, and not hard. It is little used in Central America except for firewood. The gum of certain Mexican species supplies commercial copal, employed in varnish making and as incense. Indian names are: Kar-mari (Cabécara); Dorí-tshka (Bribrí); Dibit-krá (Brunka); Tshutshu-kara (Guatuso).

Bursera tomentosa (Jacq.) Triana & Planch. Between Guachipelín and Liberia, Guanacaste, *Brenes 15506, 15589.* Also in Venezuela and Colombia. A small tree; leaflets 9–11, oblong to ovate, obtuse, coarsely crenate, densely pubescent, the rachis broadly winged.

PROTIUM Burm.

Glabrous or somewhat pubescent trees, the sap aromatic; leaves pinnate, the leaflets few, petiolulate, large, entire; flowers small, greenish or whitish, paniculate; calyx 4–5-lobulate; petals 4 or 5; fruit an indehiscent drupe.—A few additional species are represented in Central America.

Icica confusa Rose, N. Amer. Fl. 25: 260. 1911. Diquís Valley, between Ríos Volcán and Convento, *Pittier 12106.* Known only from the original collection. Leaflets 5–7, lanceolate, somewhat pubescent when young, acuminate, 8–12 cm. long; panicles narrow, pubescent; petals and ovary pubescent. I have not transferred this species to *Protium* because it probably should be reduced to synonymy. Probably there are in Costa Rica not more than two species of *Protium, P. sessiliflorum* with sessile flowers, and another with pedicellate flowers which may well be only a form of the Mexican *P. Copal* (Schlecht. & Cham.) Engler. In order to decide the matter, it is necessary to have a greater amount of Central American material than is now available for study.

Protium costaricense (Rose) Engler, Nat. Pflanzenfam. ed. 2. 19a: 414. 1931. *Icica costaricensis* Rose, N. Amer. Fl. 25: 259. 1911. Las Delicias, Santa Clara, *Biolley 10665*. Forests of the Atlantic coast; region of San Ramón. Endemic. A tall tree; leaflets 5–9, lanceolate, pubescent when young, acuminate, 7–15 cm. long; panicles 5 cm. long, pubescent; petals pubescent; ovary pubescent. The name Copal is given in Costa Rica to the various species of *Protium*, and probably to this. From wounds in the bark there runs a transparent resin.

Protium glabrum (Rose) Engler, Nat. Pflanzenfam. ed. 2. 19a: 414. 1931. *Icica glabra* Rose, N. Amer. Fl. 25: 259. 1911. Forests of Buenos Aires, *Tonduz 6682*. Also in Panama. A glabrous tree; leaflets 5, oblong or elliptic, 10–15 cm. long, short-acuminate; panicles almost glabrous, slender, 5–7 cm. long; petals pubescent; ovary glabrous.

Protium lucidum (Rose) Engler is a species of *Mauria* (Anacardiaceae).

Protium Pittieri (Rose) Engler, Nat. Pflanzenfam. ed. 2. 19a: 414. 1931. *Icica Pittieri* Rose, N. Amer. Fl. 25: 260. 1911. Río Blanco, Llanuras de Santa Clara, *Pittier 13426*. Known only from the original collection. Leaflets 3 or 5, elliptic, short-acuminate, 10–20 cm. long, pubescent when young; panicles 5–7 cm. long, pubescent; petals pubescent.

Protium sessiliflorum (Rose) Standl. *Icica sessiliflora* Rose. Golfo Dulce. Also in Panama and Nicaragua. A tall, glabrous tree; leaflets 5 or 7, oblong or elliptic, 10–20 cm. long, short-acuminate; panicles somewhat pubescent, the flowers sessile (pedicellate in the other species listed here).

MELIACEAE. Mahogany Family

Reference: P. Wilson, N. Amer. Flora 25: 263. 1924.

Trees or shrubs; leaves usually alternate, pinnate, without stipules, the leaflets entire or lobulate; flowers regular and perfect, the inflorescence terminal or axillary; sepals 4 or 5, free or united; petals 4 or 5, distinct; stamens 8 or 10, the filaments commonly united to form a tube; ovary 2–5-celled, the ovules 2 or more in each cell; fruit capsular, drupaceous, or baccate.—Another genus represented in Central America is *Cabralea*, with one species in Guatemala.

CARAPA Aubl.

Trees; leaflets few or numerous, large, entire; flowers in terminal or axillary panicles; stamens united to form a lobulate tube, the anthers sessile inside the tube; ovary 4–5-celled, the ovules 4–8 in each cell; capsule large, globose, woody or fleshy.—Another Central American species occurs in Nicaragua.

Carapa guianensis Aubl. Forests of the Atlantic coast. Central America to Brazil. A large or medium-sized tree; leaflets 10–14 or more, oblong, 15–27 cm. long, obtuse and short-acuminate, glabrous; flowers glabrous, 5 mm. long, in large, axillary panicles; fruit 7–10 cm. broad. The wood is reddish brown, hard and compact, not very fine-grained, and durable. In some regions it is used for general construction, and it has many of the properties of mahogany without its handsome appearance. It is suitable for cabinetwork and many other purposes. It is said that the tree is sometimes known in Costa Rica by the name Caoba.

Carapa nicaraguensis C. DC. Golfito de Golfo Dulce, collected only by Brenes. Nicaragua. An almost glabrous tree; leaflets 6–8, oblong-elliptic or oblong-obovate, 10–30 cm. long or larger, rounded and inconspicuously mucronate at the apex, obtuse at the base, coriaceous; sepals and petals 4, the sepals glabrous; petals 5 mm. long.

Carapa Slateri Standl. *Cedro macho.* Forests of the Atlantic coast. Also in Panama. A tall tree; leaflets about 6 pairs, oblong, 13–20 cm. long or larger, rounded at the apex, glabrous; inflorescence pubescent, 14 cm. long, the petals 3–3.5 cm. long. The tree is known in Panama by the name Cedro bateo.

CEDRELA P. Br. Spanish cedar

Medium-sized or large trees; leaves pinnate, the leaflets numerous, entire; flowers in terminal or subterminal panicles; petals 4 or 5; stamens 4–6, the filaments free; ovary 5-celled, the ovules 8–12 in each cell; capsule woody, opening by 5 valves; seeds samara-like, winged.—Other species occur in Central America. These trees are well known for their wood, which is reddish, fragrant, not heavy, and rather soft. It is exported from Central America for manufacture of cigar boxes, being the only wood commonly used for the purpose in the United States. In Costa Rica it is employed for all kinds of construction and for furniture, also for canoes. It has the great

advantage of not being attacked by insects. It receives its name of Cedro (cedar) because of the resemblance of its wood to that of the Old World Cedar, of the genus *Cedrus* (Coniferae).

Cedrela fissilis Vell. Dry forests of the Pacific coast. Ranging to Brazil. A large or medium-sized tree with broad crown; leaf rachis short-pilose, the leaflets 16–26, oblong, acuminate, pilose beneath; flowers 8–9 mm. long; capsule 3 cm. long. In Panama this species is known by the names Cedro grenadino and Cedro real.

Cedrela mexicana Roem. *Cedro amargo, Cedro blanco, Cedro dulce, Cedro colorado, Cóbano, Cedro cóbano. C. Glaziovii* C. DC. Common in the tierra caliente of both coasts. Mexico to the Antilles and South America. A large or medium-sized tree, the trunk short or tall, the crown rounded or elongate, the bark dark-colored; leaf rachis usually glabrous, the leaflets 10–30, lanceolate, 7–13 cm. long, glabrous, or sometimes puberulent beneath on the veins; flowers white, 6 mm. long; capsule 4 cm. long. The most common species of Central America, abundant in many regions and exported in large quantities to foreign countries. Indian names reported for this or other species are: Uruk (Cabécara, Bribrí); Runkrá (Brunka); Rru-rrugá, Rruk (Térraba); Aluk (Bribrí); Uluk (Tucurrique); Tali; Táali (Guatuso); Tiri-gú, Tirikrú (Cabécara); Uara-krá (Brunka), Rru-argá (Térraba).

Cedrela salvadorensis Standl. *Cedro dulce.* Dry forests of Guanacaste. Also in Salvador. A large tree; leaflets densely and softly pubescent; capsule 8–12 cm. long. Distinguished by its exceedingly large capsules. In Salvador the tree is called Cedro macho.

Cedrela Tonduzii C. DC. Bull. Herb. Boiss. II. 5: 427. 1905. *Cedro, Cedro dulce.* El Copey, 1,800 meters, *Tonduz 7357.* Known only from the region of the type. A medium-sized tree; leaf rachis densely puberulent, the leaflets 8–16, oblong-lanceolate or oblong-ovate, soft-pubescent beneath; flowers 8 mm. long.

GUAREA Allamand

Trees or shrubs; leaves even-pinnate, the leaflets opposite or alternate, entire; inflorescence axillary; sepals usually united, rarely free; petals 4 or 5; stamens united, the anthers included within the tube; ovary 4–5-celled, the ovules 1 or 2 in each cell; capsule woody or coriaceous, generally larger than in *Trichilia.*—Other species

grow in Central America. The wood is similar to mahogany and Spanish cedar and has the same local uses, but it is not exported. Most trees of this genus are small or medium-sized. Most of the species are much alike and distinguishable only by details of flower structure.

Guarea brevianthera C. DC. Smiths. Misc. Coll. 68, No. 6: 1. 1917. Forests of La Palma, *Tonduz 12592*. Common in forests of the Atlantic slope, ascending to 1,400 meters; also in forests of Guanacaste; San Ramón. Endemic. A shrub or small tree, glabrous; leaflets 4–6, elliptic, 10–15 cm. long or larger, short-acuminate; panicles 4–7 cm. long; flowers white, 6 mm. long, glabrous; capsule red and yellow.

Guarea bullata Radlk. Bull. Herb. Boiss. II. 5: 192. 1905. Pastures of Las Vueltas, Tucurrique, *Tonduz 12838*. Reported from El General. Endemic. A tree, the young leaves villous; leaflets 10–12, oblong, 17–22 cm. long, obtuse or short-acuminate, pilose beneath; panicles 6–10 cm. long; capsule globose, 2–2.5 cm. long.

Guarea Caoba C. DC. Bull. Herb. Boiss. II. 5: 421. 1905. *Caoba*. Forests of Trejos, Las Vueltas, Tucurrique, 700–1,000 meters, *Tonduz 13113*. Known only from the original collection. A tree; leaflets 10–12, oblong, 10–15 cm. long, short-acuminate, puberulent or glabrous beneath; panicles raceme-like, 9–12 cm. long, the flowers 6–7 mm. long, the petals glabrous or with a few hairs; capsule 3 cm. broad.

Guarea Donnell-Smithii C. DC. Bull. Herb. Boiss. II. 5: 419. 1905. Boca Culebra, Prov. Limón, *Pittier 12093*. Pacific tierra caliente; San Ramón. Endemic. A tree, sometimes 12 meters high, the branchlets somewhat pilose; leaflets 4–6, elliptic or oval, 10–15 cm. long, short-acuminate, setose-pilose; petals 3.5 cm. long, pilose.

Guarea erythrocarpa C. DC. Bull. Herb. Boiss. II. 5: 420. 1905. Forests of Trejos, Las Vueltas, Tucurrique, 635–700 meters, *Tonduz 13112*. Forests of the Atlantic slope, 600–1,500 meters. Endemic. A medium-sized tree with rounded crown; leaflets 6, glabrous, as much as 24 cm. long and 10 cm. wide; petals glabrous, 12 mm. long; capsule 3 cm. long, red.

Guarea excelsa HBK. *Sota-caballo* (probably an erroneous name). Forests of the tierra caliente; San Ramón; at 1,100 meters or less. Extending to Mexico. A medium-sized tree or sometimes

only a shrub; leaflets 4–6, oblong to elliptic, 6–18 cm. long, barbate beneath in the axils of the nerves, glabrous elsewhere; petals 3.5–5 mm. long, puberulent; capsule 2 cm. long.

Guarea Guara (Jacq.) P. Wilson. *G. trichilioides* L. Forests of the Atlantic tierra caliente. Ranging to West Indies and South America. A small or medium-sized tree; leaflets 8–20, elliptic to oblong, 8–20 cm. long, glabrous; petals 5–7.5 mm. long, white, pubescent; capsule 1.5–2 cm. broad.

Guarea Hoffmanniana C. DC. in DC. Monogr. Phan. 1: 570. 1878. Without definite locality, *Hoffmann 755*. Endemic. Leaflets 12, oblong or elliptic-oblong, 16 cm. long, somewhat pubescent beneath on the veins, short-acuminate; petals sericeous, 14 mm. long; ovary villous.

Guarea microcarpa C. DC. Bull. Herb. Boiss. II. 5: 420. 1905. *Cocora*. Forests of Trejos, Las Vueltas, Tucurrique, 700 meters, *Tonduz 13114*. Known only from the region of the type. A tree; leaflets 4–10, oblong-lanceolate, acute, 9–15 cm. long, glabrous; panicles 4–7 cm. long; petals 5–6 mm. long; ovary glabrous; capsule 1.5 cm. long.

Guarea Pittieri C. DC. Smiths. Misc. Coll. 68, No. 6: 6. 1917. Tuis, 600 meters, *Pittier 11245*. Forests of the Atlantic tierra caliente. Endemic. A tree; leaflets 4–8, oblong to elliptic, 12–20 cm. long, short-acuminate, somewhat puberulent beneath on the veins; panicles large, as long as the leaves; petals 10 mm. long, pilose.

Guarea rhopalocarpa Radlk. Bull. Herb. Boiss. II. 5: 191. 1905. Forests of Tuis, 650 meters, *Tonduz 11306*. Known only from the region of the type. A medium-sized tree; leaflets 6–8, oblong, short-acuminate, 15–20 cm. long, glabrous; capsules 3–4.5 cm. long, pyriform.

Guarea Tonduzii C. DC. Smiths. Misc. Coll. 68, No. 6: 4. 1917. Cerros de Tremendales, near San Ramón, 1,300 meters, *Tonduz 17677*. Region of San Ramón. Endemic. A tree of 4–6 meters; leaflets 10–12, oblong-elliptic, 9–20 cm. long, densely soft-pubescent beneath; capsule 2 cm. long.

Guarea tuisana C. DC. Bull. Herb. Boiss. II. 5: 421. 1905. Tuis, *Pittier 11418*. Known only from the original collection. A tree; leaflets 4–8, oblong, 14–20 cm. long, short-acuminate, some-

what puberulent beneath on the veins; panicles spike-like, much shorter than the leaves; petals 7 mm. long, puberulent; ovary pilose.

Guarea xiroresana C. DC. Bull. Herb. Boiss. II. 5: 418. 1905. Shirores, Talamanca, *Pittier 9168*. Known only from the original collection. Leaflets 10, glabrous, oblong, as much as 16 cm. long, acuminate; petals 5 mm. long, sericeous; capsule 1.5 cm. long. Probably a synonym of *G. Guara*.

MELIA L. Chinaberry

Melia Azedarach L. *Paraíso*. Often planted as an ornamental or shade tree; probably naturalized in some localities. Native of Asia. The tree grows rapidly but is short-lived. The wood is soft and brittle, and the branches are easily broken by wind or other agents.

SWIETENIA L. Mahogany

Large or small trees; leaves alternate, even-pinnate, the leaflets opposite; flowers small, white, in axillary or subterminal racemes; calyx 5-lobulate; petals 5, free; stamens united to form a short tube, the anthers included in the tube; ovary 5-celled, the ovules numerous; fruit a large, woody capsule.—In Central America there are only two species, which range to Mexico. Another species (*S. Mahagoni*) grows in the West Indies, while from South America there are described three other species, which are probably mere forms of *S. macrophylla*. The genus extends to eastern Peru and western Brazil. The mahoganies are not so plentiful in Costa Rica as in Panama and Honduras, but they grow in both coasts, and the lumber is sometimes exported. This is the most celebrated of all American woods, known in all civilized parts of the globe, and highly esteemed for furniture. It is, in fact, the standard by which all fine woods are judged. In Costa Rica mahogany is employed for making fine furniture, and also for the most ordinary purposes that would seem quite impossible in foreign countries, where it sells at a high price.

Swietenia humilis Zucc. *Caoba*. I have seen no Costa Rican specimens, but it is reported that the tree grows in the Pacific coast, although not in large amounts. Leaflets sessile or nearly so, the apex much elongate and slender, 6–10 cm. long. This species extends to Mexico.

Swietenia macrophylla King. *Caoba. Honduras mahogany.* This tree is reported to be plentiful in the region of the Río San Juan

and its tributaries, Atlantic coast, and it probably grows elsewhere in the same coast, for it ranges from Mexico to Panama, and perhaps even to Colombia, Brazil, and Peru. Leaflets larger than in *S. humilis*, 7.5–15 cm. long or larger, acute or acuminate, petiolulate.

TRICHILIA L.

Trees or shrubs; leaves alternate, pinnate, the leaflets alternate or opposite, entire; flowers in terminal or axillary panicles or cymes; sepals 4 or 5, united or rarely distinct; petals 4 or 5; filaments winged, more or less united to form a tube, the anthers exserted; ovary 2–3-celled, with 2 ovules in each cell; capsule 2–3-celled, dehiscent.—Other species grow in Central America.

Trichilia acutanthera C. DC. Bull. Herb. Boiss. II. 5: 422. 1905. Forests of Currís, Diquís Valley, 50 meters, *Pittier 12036*. Forests of the Pacific coast; San Ramón. Also in Panama. A tree of 6 meters; leaflets 7–9, oblanceolate or obovate, 12–15 cm. long, short-acuminate, densely and softly pubescent beneath; panicles 5–12 cm. long; petals 3–3.5 mm. long, strigillose; ovary pilose.

Trichilia Adolfi Harms, Notizbl. Bot. Gart. Berlin 9: 433. 1925. Río de Las Vueltas, Tucurrique, 630 meters, *Tonduz 13360*. Known only from the original collection. A tree of 7 meters; leaflets 6–8, oblong-elliptic, 4–10 cm. long, somewhat puberulent or glabrous; panicles equaling the petioles; petals 4 mm. long, pubescent.

Trichilia albiflora C. DC. Smiths. Misc. Coll. 68, No. 6: 7. 1917. Ojos de Agua, Prov. Alajuela, 900 meters, *Pittier 3677*. Known only from the original collection. A tree; leaflets 11–17, oblong-elliptic to lanceolate, 4–8 cm. long, acuminate, pilose; panicles 15–30 cm. long, the peduncles elongate; petals 5.5 mm. long, glabrous; ovary pilose.

Trichilia anisopleura C. DC. Bull. Herb. Boiss. II. 5: 424. 1905. *Cedro macho, Cedro dulce*. Roadside near Nicoya, *Tonduz 13985*. Forests of Guanacaste. Endemic. A tree of 12 meters; leaflets about 11, ovate, 8–11 cm. long, narrowly acuminate, densely and softly pubescent beneath; panicles large but shorter than the leaves; petals 4 mm. long, glabrous; ovary pilose.

Trichilia arborea C. DC. Bull. Herb. Boiss. II. 5: 426. 1905. Roadside near Nicoya, *Tonduz 13859*. Also in Yucatan. A tree; leaflets 9–11, ovate, 2.5–4.5 cm. long, acuminate, villous beneath; panicles subterminal, 5–8 cm. long; petals 4.5–5 mm. long, puberulent; ovary pilose.

Trichilia Brenesii Standl., sp. nov.—Ramuli gracillimi dense breviter subadpresso-pilosi, internodiis brevibus; folia inter minora, petiolo gracili 4–5 cm. longo densiuscule pilis brevibus et longioribus intermixtis piloso, rhachi gracili 4.5–6 cm. longa ut petiolo pilosa; foliola trijuga membranacea graciliter 4–5 mm. longe petiolulata lanceolato-oblonga vel anguste elliptico-oblonga 5.5–8 cm. longa 1.8–2.5 cm. lata subabrupte anguste obtuso-acuminata, basi obtusa vel acutiuscula, supra in sicco obscure viridia praesertim ad costam pilosa, subtus paullo pallidiora sparse breviter pilosa vel glabrata, costa gracili elevata, nervis lateralibus utroque latere ca. 12; paniculae pyramidales vel thyrsiformes ca. 5.5 cm. longae brevissime pedunculatae laxe multiflorae, ramis puberulis, pedicellis gracilibus 1–2 mm. longis; calyx parvus vix ultra 1.5 mm. latus, sepalis basi longe connatis brevibus late triangularibus acutis extus puberulis; petala 4 vix 2 mm. longa ovato-oblonga acutiuscula extus sparse minutissime pilosula; stamina petalis paullo breviora, filamentis subulatis fere ad basin liberis.—Colinas del Tremendal (San Pedro) de San Ramón, April, 1935, *Brenes 20510* (type in Herb. Field Mus.).

Trichilia cuneata Radlk. *T. Biolleyi* C. DC. Bull. Herb. Boiss. II. 5: 423. 1905 (Nuestro Amo, Llanos de Turrúcares, *Pittier 16495*); *T. Biolleyi* var. *nicoyensis* C. DC. op. cit. 424 (Nicoya, *Tonduz 13959*). Thickets and forests, Meseta Central to the Pacific coast; region of San Ramón. Panama to Guatemala. A tree of 4.5–10 meters; leaflets 5–9, obovate, 6–15 cm. long, short-acuminate, softly pubescent beneath; panicles subterminal or axillary, much shorter than the leaves; petals 3–3.5 mm. long, pilose; ovary pilose.

Trichilia havanensis Jacq. *Urruca. T. alajuelana* C. DC. ex Donn. Smith. Enum. Pl. Guat. 5: 13, nomen. 1899 (type from Costa Rica); *T. havanensis* var. *pilipetala* C. DC. Bull. Herb. Boiss. II. 6: 985. 1906 (type from Costa Rica). Common in thickets and hedges of the Meseta Central, 1,100–1,400 meters, sometimes ascending to 2,100 meters, and then growing in wet forest, extending also to the Pacific coast. A species of wide distribution. A shrub or tree of 2–9 meters, glabrous; leaflets 3–9, obovate or oblanceolate, rounded or acute at the apex; panicles small, axillary, shorter than the petioles, the flowers greenish white, the petals 4–4.5 mm. long, somewhat pilose; capsule 9–13 mm. long; ovary glabrous. The branches are sometimes employed as decorations in houses and churches.

Trichilia hirta L. *T. spondioides* Jacq. Cantón de Dota and in the Pacific coast. A species of wide distribution. A shrub or small tree; leaflets 9–21, lanceolate, 4–12 cm. long, acute or acuminate, somewhat pilose beneath or almost glabrous; panicles large but shorter than the leaves; petals white, 5–6 mm. long, glabrous; ovary pilose; capsule globose, 1–1.5 cm. long, tomentulose.

Trichilia montana HBK. *T. montana* var. *acutivalvis* C. DC. Bull. Herb. Boiss. II. 5: 422. 1905 (Santo Domingo de Osa, *Tonduz 10031*). Pacific coast. Guatemala to Colombia. A small tree; leaflets 3–5, oblong-elliptic, 9–16 cm. long, acuminate, coriaceous, glabrous or pubescent beneath; panicles shorter than the petioles; petals puberulent; ovary pilose; capsule 1–1.5 cm. long, densely pilose.

Trichilia obtusanthera C. DC. Bull. Herb. Boiss. II. 5: 423. 1905. ?*T. Tonduzii* C. DC. l. c. (forests of Río Naranjo, 200 meters, *Pittier 7709*). Forests of Río Naranjo, 200 meters, *Tonduz 7709*. Forests of the tierra caliente, and in Cantón de Dota, ascending to 1,600 meters. A tree of 7 meters; leaflets about 7, oblong-lanceolate or oblong, 8–15 cm. long, acuminate, somewhat puberulent; panicles equaling or longer than the petioles; petals 3 mm. long, puberulent; ovary pilose.

Trichilia Oerstediana C. DC. Region of San Ramón, at 1,000 meters, collected only by Brenes. Ranging to Guatemala. A shrub or small tree of 1.5–6 meters; leaflets 5–11, obovate or oblong-obovate, 5–8 cm. long, rounded or obtusely short-acuminate at the apex, sparsely hispidulous above, densely and softly pilose beneath, the rachis sometimes winged; panicles axillary, shorter than the petioles; flowers 4–5-parted, the petals 4–4.5 mm. long; capsule about 1 cm. long.

Trichilia Pittieri C. DC. Bull. Herb. Boiss. II. 5: 425. 1905. *Cedro cóbano*. Tuis, *Pittier 11235*. Endemic. A tree of 25–30 meters; leaflets 9–17, oblong or oblong-elliptic, 14–20 cm. long, acuminate, somewhat puberulent; panicles 15–20 cm. long; petals 3.5–4 mm. long, puberulent; ovary puberulent.

Trichilia polyneura C. DC. Bull. Herb. Boiss. II. 5: 426. 1905. Hacienda Chirripó, Zent, *Pittier 16053*. Forests of the Atlantic coast. Also in Panama. A tree of 12 meters; leaflets 7–11, elliptic or oblong-lanceolate, 8–20 cm. long or larger, acuminate, puberulent beneath; panicles 15–25 cm. long; petals 6 mm. long, pubescent; ovary villous.

Trichilia propinqua (Miq.) C. DC. *Camfine*(?). Forests of the Atlantic coast. Nicaragua to northern South America. A small tree; leaflets 5–9, lance-oblong, 10–16 cm. long, somewhat coriaceous, pilose or almost glabrous beneath; panicles shorter than the leaves; petals puberulent; capsule oblong, very narrow, 2 cm. long. In Panama this tree is sometimes given the name of Alfajillo.

Trichilia tuberculata (Triana & Planch.) C. DC. Coto. Also in Panama. A tree of 9–12 meters; leaflets 5–7, oblong-elliptic or oblong-lanceolate, 4–12 cm. long, acuminate, almost glabrous; panicles much shorter than the leaves; petals 2.5 mm. long, puberulent; ovary pilose; capsule narrow, tuberculate. Easy to recognize in fruiting state because of the tuberculate capsules.

MALPIGHIACEAE. Malpighia Family

References: Niedenzu, Pflanzenreich IV. 141. 1928; J. K. Small, N. Amer. Flora 25: 117. 1910.

Vines, shrubs, or small trees, the pubescence most often of appressed, shining hairs attached by their middle; leaves chiefly opposite, with stipules upon or at the base of the petiole, dentate, lobate, or entire; flowers perfect, small or large; sepals 5, usually furnished with dorsal glands; petals 5, unequal, unguiculate, often dentate or lobulate; stamens 5 or 10, the filaments more or less united; ovary commonly of 3 carpels; fruit a drupe or capsule, or composed of usually 3 nutlets or samaras.—Other genera are known in Central America. The plants have little economic value, although some bear edible fruits. The flowers are chiefly large and showy, most often bright yellow.

BANISTERIA L.

Woody vines; leaves entire, petiolate; calyx with 8 or 10 glands, sometimes eglandular; petals denticulate; fruit of 3 samaras, the wing thickened along the interior margin.—Other species are known from Central America.

Banisteria argentea (HBK.) Spreng. *B. Schomburgkiana* Benth.; *B. argentea* var. *obtusiuscula* Ndzu. Common in thickets, Meseta Central to the Pacific coast. Guatemala to Peru. A small or large vine; leaves ovate or oval, 3–12 cm. long, short-acuminate, green above, densely sericeous and whitish beneath; flowers yellow, in paniculate umbels; samaras 3 cm. long.

Banisteria cornifolia (HBK.) Spreng. *Nance colorado. B. maracaybensis* Juss.; *Banisteriopsis cornifolia* C. B. Robinson.

Thickets of the Pacific tierra caliente; region of San Ramón, at 1,200 meters or less. Nicaragua to Colombia. Leaves oblong or elliptic, acute or short-acuminate, almost glabrous; flowers yellow, in paniculate racemes; samaras 2.5–3.5 cm. long.

Banisteria discolor (Donn. Smith) Niedenzu, Pflanzenreich IV. 141: 451. 1928. *B. cornifolia* var. *discolor* Donn. Smith, Bot. Gaz. 24: 391. 1897. *Banisteriopsis discolor* Small, N. Amer. Fl. 25: 132. 1910. San Pedro de La Calabaza, 1,100 meters, *Tonduz 10924*. Known only from the original collection. Similar to *B. cornifolia*, but the leaves sericeous and whitish beneath.

BUNCHOSIA Rich.

Shrubs or small trees; leaves usually with glands on the petioles or blades, entire, petiolate; flowers yellow, paniculate; fruit a red or orange drupe.—There are other species in Central America. All the species are much alike, and it is improbable that there really are in Costa Rica as many distinct species as there are names in the following list.

Bunchosia cornifolia HBK. *Cerezo.* Forests and thickets of the coasts; San Ramón; at 1,200 meters or less. Mexico to Ecuador. A shrub, the leaves ovate or oval, 5–15 cm. long or larger, sparsely pilose beneath, acute or short-acuminate; petals 5–6 mm. long; drupes 1–1.5 cm. long.

Bunchosia gracilis Niedenzu. Regions of Aguacate and Nicoya. Mexico to Panama. A shrub; leaves oblong to elliptic, 5–15 cm. long, acute, green, sparsely pilose beneath; petals 5–7 mm. long. One Costa Rican collection was cited by Hemsley as *B. Lindeniana* Juss. Known in Panama by the name Cerezo, the fruits somewhat resembling cherries in size and color.

Bunchosia lanceolata Turcz. Forests of the tierra caliente; region of San Ramón; at 1,800 meters or less. Mexico to Bolivia. A shrub; leaves oblong or elliptic, 6–15 cm. long, acuminate, almost glabrous; drupes 1.5–2 cm. long.

Bunchosia macrophylla Rose ex Donn. Smith in Pittier, Prim. 2: 64. 1898. Between Sipurio and Tsuritkub, Talamanca, 100 meters, *Pittier & Tonduz 8686*. Forests of the Atlantic coast. Endemic. A tree of 4 meters; leaves very large, oval, 15–38 cm. long, rounded at the base, obtuse, densely villous beneath; petals 1 cm. long. Probably nothing more than a form of *B. pilosa*.

Bunchosia media (Ait.) DC. Region of San Ramón, 900 meters (*Niedenzu*). Yucatan and West Indies. Leaves elliptic to obovate, 4–12 cm. long, acute or acuminate, almost glabrous; petals 7–9 mm. long; fruits 1 cm. long.

Bunchosia pilosa HBK. *Cerezo. B. costaricensis* Rose ex Donn. Smith in Pittier, Prim. 2: 64. 1898 (Río Tilirí, San José, *Pittier 4286*). Common in thickets of the central region, 1,100–1,800 meters; region of San Ramón. Ranging to Colombia. A shrub or small tree; leaves oblong to oval, 10–18 cm. long, obtuse or rounded at the base, villous beneath.

BYRSONIMA Rich.

One other Central American species occurs in British Honduras.

Byrsonima crassifolia (L.) DC. *Nance.* Meseta Central to the coasts, most abundant on the Pacific slope, in some places forming characteristic small thickets called *nancitales.* A species of wide distribution in tropical America. A shrub or small tree; leaves oblong to elliptic or obovate, 5–16 cm. long, acute, almost glabrous above, lanate beneath with a brownish tomentum; panicles short or elongate, raceme-like, the flowers showy, yellow, turning reddish as they wither; fruit a globose, yellow drupe 1 cm. or more in diameter. The small fruits are edible and have a flavor suggestive of apple, but they are little eaten except by children, although sometimes they are offered for sale in the markets. They are employed occasionally for making the beverage called chicha. It is said that an infusion of the bark is given for chest colds. The wood is reddish or pinkish brown, rather hard and heavy, and brittle. In some regions it is employed for making charcoal and for construction. Local Indian names are Bek (Cabécara) and Shkir-ko (Térraba). Niedenzu reports for Costa Rica *B. pulchra* DC., but it seems more satisfactory to refer all Central American material to a single variable species, *B. crassifolia.* It is certain that the differences between the numerous species recognized by that author are variable and minute, and of doubtful systematic importance.

GAUDICHAUDIA HBK.

Mostly small and slender, woody vines; flowers small, yellow; calyx with 8 or 10 glands; petals dentate; stamens 5; fruit of 3 samaras, these with more or less united, lateral wings.—Besides the normal flowers, there often are abnormal and apetalous ones. Other species are known from Central America. *G. Schiedeana* Juss.

has been reported from Costa Rica but I have seen no specimens, although it is not improbable that this species does occur here.

Gaudichaudia Karwinskiana Juss. Meseta Central and Pacific slope; a plant of dry thickets. Ranging to Mexico. Leaves short-petiolate, oval or ovate-oblong, 2–7 cm. long, mucronate, pilose; petals about 1 cm. long; samaras 12 mm. long, emarginate at the apex, the wing not continuous. Some Costa Rican collections have been referred to *G. filipendula* Juss.

Gaudichaudia pentandra Juss. Meseta Central. Ranging to Mexico. Similar to the preceding species, but the samaras not emarginate, the wing continuous.

HETEROPTERIS HBK.

Woody vines with entire leaves; flowers small or large, mostly yellow, in paniculate cymes; calyx with 8 glands or eglandular; stamens 10; samaras 2 or 3, the wing thickened along the interior margin.—Other species are known from Central America.

Heteropteris Beecheyana Juss. In thickets, Meseta Central to the Pacific coast. Mexico to Bolivia. A large vine; leaves oblong to oval, 3–7 cm. long, acute or mucronate, almost glabrous above, tomentose beneath, the veins very prominent and conspicuous; glands 2–6 near the base of the leaf blade, sessile; flowers pink; samaras 3–4 cm. long, reddish; sepals erect.

Heteropteris Gayana Juss. *Banisteria Gayana* Small. Thickets of the Pacific tierra caliente. Ranging to Mexico. Leaves ovate to oblong, almost glabrous, the blade with 2 stipitate glands near the base; samaras 3–4 cm. long; sepals erect.

Heteropteris laurifolia (L.) Juss. *Corral.* Common in thickets of the Pacific coast. Mexico to Colombia and the Antilles. A large vine; leaves without glands, oblong or lanceolate, acuminate, coriaceous, with pubescence of reddish hairs or almost glabrous; flowers yellow, in large or small panicles; sepals recurved at the apex; samaras 3.5–4 cm. long.

Heteropteris macrostachya Juss. *Banisteria obovata* Small, N. Amer. Fl. 25: 136. 1910 (near Nicoya, *Tonduz 13478*). Known in continental North America only from Nicoya. Extending to Brazil and West Indies. Leaves obovate, 7–15 cm. long, rounded and mucronate at the apex, obtuse or subcordate at the base, pilose beneath; sepals erect; samaras 4–4.5 cm. long.

HIRAEA Jacq.

Shrubs or trees; leaves entire, the stipules arising from the petiole; calyx with 8 glands or eglandular; petals yellow; stamens 10; samaras 3, with lateral wings and dorsal crests.—From Central America other species are known.

Hiraea fagifolia (DC.) Juss. Tucurrique, collected only by Tonduz. Guatemala to Brazil. A shrub or small tree; leaves oblong or obovate, 6–15 cm. long, acuminate, coriaceous, almost glabrous, obtuse at the base; petals 1 cm. long; samaras 2.5–4 cm. long, the wings membranaceous.

Hiraea faginea (Swartz) Niedenzu. Thickets of the Atlantic coast. Guatemala to Brazil. Leaves obovate or elliptic, 7–15 cm. long, coriaceous, acute, glabrous above, sericeous beneath; samaras 2 cm. long, the wings coriaceous.

Hiraea obovata Niedenzu. Thickets of the Pacific tierra caliente. Guatemala to Bolivia. A shrub of 2–3 meters; leaves obovate, obtuse, almost glabrous, the petioles very short; samaras 2.5–3 cm. long, the wings membranaceous.

MALPIGHIA L.

Shrubs or small trees; leaves entire, short-petiolate; flowers medium-sized, in small, axillary cymes; calyx with 6–10 glands; petals pink; ovary 3-lobulate, glabrous; fruit a red or orange drupe.—Other species have been collected in Central America.

Malpighia glabra L. *Júpiter* (*Pittier*). In thickets and hedges, Meseta Central to the Pacific coast. Widely dispersed in tropical America. A shrub or tree of 6 meters or less, almost glabrous; leaves elliptic to lanceolate, acute, somewhat sericeous when young, 3–8 cm. long; petals 6–8 mm. long; fruits globose, juicy, red, 1 cm. long. The fruit is edible but very acid.

Malpighia mexicana Juss. *Acerola. M. edulis* Donn. Smith, Bot. Gaz. 24: 391. 1897 (forests of La Carpintera, *Pittier & Tonduz 4394*). Meseta Central. Extending to Mexico. A small tree; leaves elliptic, 10–18 cm. long, acuminate, tomentose beneath; petals 10–13 mm. long.

MASCAGNIA Bert.

Woody vines; leaves entire; calyx with 8 or 10 glands; stamens 10; fruit of 3 samaras provided with lateral wings that are distinct or more or less united, also with a dorsal wing.—From Central America a few other species are known.

Mascagnia stannea (Griseb.) Niedenzu, Pflanzenreich IV. 141: 112. 1928. *Heteropteris stannea* Griseb. Vid. Medd. Kjoebenhavn 46. 1852. Cerro de Aguacate, *Oersted* (reported by Niedenzu, in error, as Nicaragua). Region of San Ramón. Endemic. A woody vine; leaves ovate, 6–14 cm. long, short-acuminate, sericeous beneath; flowers small, yellow; stamens 10; fruit of 3 samaras provided with lateral wings.

Mascagnia vacciniifolia Niedenzu. Collected only at San Miguel. Ranging to southern Mexico. Leaves obovate, as much as 3 cm. long, rounded at the apex, sericeous when young, glabrous when mature; petals pink, 5–6 mm. long; samaras 2.5 cm. long, the dorsal wing obsolete.

STIGMAPHYLLON Juss.

Slender, woody vines, small or much elongate; leaves entire, dentate, or lobulate, petiolate; flowers yellow, large, in umbelliform corymbs; calyx with 8 glands; stamens 10; fruit of 2 or 3 large samaras, the wing thickened along the outer edge.—Several other species are known in Central America.

Stigmaphyllon ellipticum (HBK.) Juss. Common in thickets of the tierra caliente; ascending to at least 1,025 meters. Mexico to Brazil. A small or large vine; leaves oblong or oval, 3–10 cm. long, entire, rounded or obtuse and mucronate at the apex, almost glabrous; petals 13–18 mm. long; samaras 2.5–4 cm. long.

Stigmaphyllon Humboldtianum Juss. *S. tiliifolium* Ndzu. Common in thickets of the tierra caliente. Mexico to Brazil and Bolivia. A large vine; leaves ovate to rounded, 10–16 cm. long or larger, acute to rounded at the apex, entire, truncate or somewhat cordate at the base, sericeous beneath; petals 8–10 mm. long; samaras 3.5–4 cm. long, the wings spatulate. Reported from Costa Rica under the name *S. fulgens* Juss.

Stigmaphyllon Lindenianum Juss. Common in the tierra caliente. Mexico to Panama. A small or large vine; leaves ovate to almost rounded, dentate or lobulate, truncate or cordate at the base, sericeous beneath; samaras 2–2.7 cm. long, the wing spatulate.

Stigmaphyllon puberum Juss. Thickets of the coasts. British Honduras to Brazil. A small or large vine; leaves ovate, 6–15 cm. long, acuminate, entire, sericeous beneath; petals 9–11 mm. long; samaras 2.5–3 cm. long, the wing narrowed toward the apex.

TETRAPTERIS Cav.

Large or small, scandent shrubs; leaves short-petiolate, entire; calyx with 8 glands; petals yellow; stamens 10; samaras 3, each with 4 narrow, lateral wings.—Additional species are known from Central America.

Tetrapteris discolor (Mey.) DC. Meseta Central to the Atlantic tierra caliente; region of San Ramón. Guatemala to Bolivia. Leaves oblong to ovate, as much as 13 cm. long and 5 cm. wide, acuminate, glabrous; wings of the samara very unequal, the upper ones spatulate, 1.7 cm. long, the lower ones very short. This species has been reported from Costa Rica as *T. inaequalis* Cav.

Tetrapteris calophylla Juss. Forests of the tierra caliente. Ranging to Bolivia. Leaves acute or acuminate, glabrous or sparsely pilose; petals 8–10 mm. long; samaras sericeous, the upper wings as much as 4.5 cm. long, the lower ones very short.

Tetrapteris Schiedeana Schlecht. & Cham. *Malpighia dasycarpa* Donn. Smith. In thickets and forest, Meseta Central to the coasts. Panama to Mexico. A large or small vine; leaves ovate to lanceolate, 3–10 cm. long, acute or acuminate, almost glabrous; wings of the samara almost equal, linear to oblong or spatulate, 1–2 cm. long.

TRIGONIACEAE. Trigonia Family

Reference: Standley, N. Amer. Flora 25: 297. 1924.

A single genus occurs in North America.

TRIGONIA Aubl.

Another Central American species is native in Nicaragua.

Trigonia floribunda Oerst. *T. thyrsifera* Donn. Smith, Bot. Gaz. 23: 3. 1897 (Llanos de Surubres, Prov. Alajuela, 180 meters, *Biolley 2638*). Dry thickets and forest of the Pacific tierra caliente. British Honduras to Panama. A scandent shrub; leaves opposite, stipulate, oblong or obovate, entire, acute or obtuse, pubescent or white-tomentose beneath; flowers small, in narrow, terminal panicles 10–25 cm. long; petals 5, unequal, the posterior one extended as a spur; stamens 10; fruit a 3-angulate capsule 2–3 cm. long; seeds pilose.

VOCHYSIACEAE. Vochysia Family

Reference: Standley, N. Amer. Flora 25: 301. 1924.

In North America the family is represented by a single genus.

VOCHYSIA Aubl.

Large trees; leaves opposite or verticillate, coriaceous, entire; flowers yellow, in paniculate cymes, the panicles terminal; stipules small or none; sepals 5, the posterior one produced as a spur; petals 3, unequal; fertile stamen 1; ovary free, 3-celled; fruit a coriaceous or woody, 3-angulate capsule; seeds 1 in each cell, flat, winged.—Two other species are native in Central America. The wood is pinkish brown, neither hard nor heavy but compact, and brittle. It is sometimes employed for construction.

Vochysia ferruginea Mart. Buenos Aires, 480 meters; reported from El General. Ranging to Brazil. A tree of 10–20 meters, the crown small and dense; leaves oblong or lanceolate, 8–16 cm. long, acuminate, brown-tomentose beneath; petals 7 mm. long. An exceptionally showy tree, like other species of the genus, when covered with the large panicles of bright yellow flowers. In Panama this species is called Malagueto.

Vochysia hondurensis Sprague. *Palo de chancho.* Forests of the Atlantic tierra caliente, 100–900 meters. Ranging to British Honduras. A tree of 15–25 meters, the crown dense, rounded or depressed, the trunk slender, smooth, pale gray; leaves verticillate, oblong, 8–14 cm. long, glabrous, rounded and emarginate at the apex; petals 5 mm. long. This tree has been reported from Costa Rica as *V. guatemalensis* Donn. Smith. Indian names are Tskirik and Sirbi (Bribrí).

POLYGALACEAE. Milkwort Family

Reference: Blake, N. Amer. Flora 25: 305. 1924.

Herbs or shrubs, sometimes scandent; leaves alternate, opposite, or verticillate, entire, short-petiolate, without stipules, or the stipules represented only by glands; flowers perfect, irregular, usually spicate or racemose, bracteate and bracteolate; sepals 5, distinct; petals generally 3, the interior one (keel) often rostrate or cristate; stamens generally 8, the filaments united; fruit a capsule, drupe, or samara, dehiscent or indehiscent; seed 1 in each cell.—No other genera are reported from Central America.

MONNINA Ruiz & Pavón

Herbs or erect shrubs; leaves alternate; flowers small, in terminal and axillary racemes; ovary 1-celled; fruit drupaceous or samaroid, in the latter case the wings very narrow and extending all around the

margin.—Two other species occur in Central America, one Panaman, the other Guatemalan.

Monnina Blakeana Standl., sp. nov.—Frutex dense foliatus, ramulis dense minute incurvo-puberulis; folia breviter petiolata, lamina obovato-oblonga 2–4 cm. longa 1–2 cm. lata, apice late rotundata vel obtusa, basi breviter cuneato-angustata, membranacea, utrinque sparse minute strigillosa; racemi breves densiflori foliis breviores vel aequilongi, pedicellis 2 mm. longis strigillosis, bracteis brevissimis late ovatis acutis, racemis non comosis; sepala inferiora distincta ovata acuta vel obtusa strigillosa; drupa ovoidea 5 mm. longa acutiuscula.—Dulce Nombre, Prov. Cartago, 1,400 meters, *Standley 35810* (type in U. S. Nat. Herb.). A shrub of 1.5 meters, easy of recognition because of the small leaves, rounded or very obtuse at the apex. Related to *M. xalapensis*, which has acute or acuminate leaves.

Monnina costaricensis Chodat, Bull. Soc. Bot. Belg. 30, pt. 1: 304. 1891. Rancho Flores, *Pittier 2138*. Mountain forests of the central region, 1,500–2,800 meters. Endemic. A shrub a meter high; leaves ovate to elliptic, 4–9 cm. long, acuminate, somewhat puberulent or almost glabrous; racemes not comose, short or elongate, loose, the pedicels 2.5–3 mm. long; flowers violet, the sepals distinct; drupe 8 mm. long.

Monnina Crepini Chodat, Bull. Soc. Bot. Belg. 30, pt. 1: 302. 1891. Páramos de Buena Vista, 3,000 meters, *Pittier 3495*. Known only from the type region. Leaves lanceolate, 10 cm. long, pilose when young; racemes dense, the bracts short; pedicels very short; flowers the largest of the genus. I have seen no authentic collections of this species, which may be a mere form of *M. xalapensis*.

Monnina Pittieri Chodat, Bull. Soc. Bot. Belg. 30, pt. 1: 303. 1891. Forests near Esmeralda de Irazú, *Pittier 1885*. Forests of the central mountains, 2,200–3,100 meters. Endemic. A shrub; leaves lanceolate to elliptic, 4–10 cm. long, acuminate, almost glabrous; racemes comose, dense or lax, as much as 8 cm. long, the bracts ovate, acuminate, the pedicels 2–3 mm. long; sepals free; petals violet.

Monnina saprogena Donn. Smith, Bot. Gaz. 31: 109. 1901. La Palma, 1,540 meters, *Tonduz 7406*. Forests of the slopes of Irazú and Barba, 1,500–2,400 meters. Endemic. A shrub of 1–1.5 meters; leaves elliptic to lance-oblong, 5–12 cm. long, acuminate, somewhat

coriaceous, almost glabrous; racemes not comose, paniculate, the flowers violet, 5 mm. long, the bracts ovate, acute or obtuse, the pedicels 2–3.5 mm. long; lower sepals united; drupe 5 mm. long. It is stated that this sometimes grows upon rotting trunks, but it is essentially a terrestrial shrub, and there is no reason for describing it as a "saprophytic shrub," as it was termed by Blake.

Monnina sylvatica Schlecht. & Cham. *M. sylvicola* Chod. Bull. Soc. Bot. Belg, 30, pt. 1: 303. 1891 (coffee plantations near Aserrí, *Pittier 1272*); *P. crispata* Blake. Common in forests of the central region, descending to the tierra caliente, 600–1,800 meters; region of San Ramón. Mexico to Panama. A shrub of 1–2 meters; leaves ovate to elliptic, 7–12 cm. long, acute or acuminate, almost glabrous; racemes comose, paniculate, 8–11 cm. long, the bracts very narrow, attenuate, the pedicels 1 mm. long; sepals free; petals violet; drupes dark purple or black. It seems impossible to recognize as distinct *M. crispata,* which is distinguished by inconstant variations in pubescence.

Monnina xalapensis HBK. Common in forests of the central mountains, 1,600–2,800 meters. Ranging to Mexico. A shrub or herb of 1–3 meters; leaves oblanceolate or elliptic, 3.5–9 cm. long, acuminate, almost glabrous; racemes not comose, solitary, dense, the bracts ovate, obtuse or acute, the pedicels 1–2 mm. long; sepals free; petals violet.

POLYGALA L.

Herbs (in the Costa Rican species), perennial or annual; leaves alternate, opposite, or verticillate, entire, short-petiolate or almost sessile; flowers small, in terminal or axillary racemes; sepals 5, deciduous or persistent; petals 3, united at the base; stamens 8; capsule compressed, 2-celled, sometimes winged.—A large genus, with other species in Central America.

Polygala bryzoides St. Hilaire. *P. angustifolia* HBK. Grassy places, Pacific tierra caliente; regions of Cartago and San Ramón. Mexico to Brazil. A branched annual, sparsely pubescent; leaves alternate, linear or lanceolate, 1.5–4.5 cm. long, acute; racemes 1.5–6 cm. long, the flowers purple and green, 3–4 mm. long; capsule 3 mm. long.

Polygala costaricensis Chodat, Bull. Soc. Bot. Belg. 30, pt. 1: 298. 1891. San José, *Hoffmann.* Grassy places or thickets, Meseta Central to the Pacific coast. Also in Guatemala. A perennial, some-

what woody at the base, the stems branched, 20–30 cm. long, slender, puberulent; leaves ovate to lanceolate, 3–6 cm. long, acute, puberulent; flowers violet, 8–10 mm. long, the racemes 3–12 cm. long; capsule 1 cm. long, puberulent.

Polygala Durandii Chodat, Bull. Soc. Bot. Belg. 30, pt. 1: 300. 1891. *P. Durandii* var. *crassifolia* Chod. op. cit. 301 (between San José and Las Parras, *Pittier 1339*). Pastures near Uruca, *Biolley 999*. Grassy places and thickets, Meseta Central to the Pacific coast. Also in Guatemala. Very similar to the preceding species, but the flowers smaller, 6 mm. long. Probably a mere form of *P. costaricensis*.

Polygala glochidiata HBK. Region of Alajuela, and reported from Guanacaste by Chodat. Mexico to South America. A slender annual 10–20 cm. high, branched, glandular; lower leaves verticillate, the upper alternate, linear to oblanceolate, 5–12 mm. long; racemes 1–6 cm. long, the flowers 2.5 mm. long, pink or rarely white; capsule 1.5 mm. long.

Polygala gracilis HBK. Reported from Costa Rica by Hemsley. Mexico to Venezuela. A slender annual, up to 40 cm. in height, glabrous; leaves alternate, linear, 3–9 mm. long, acuminate; flowers pink, 2.5 mm. long, the racemes as much as 9 cm. long; capsule 1.5 mm. long.

Polygala hygrophila HBK. Buenos Aires, 480 meters. British Honduras to northern South America. A slender annual, erect, 30 cm. high; lower leaves verticillate, the upper alternate, linear, 6–9 mm. long; racemes 1–2 cm. long, dense, the flowers 4.5 mm. long, pink; capsule subglobose.

Polygala longicaulis HBK. Collected at Grecia and San Mateo. Mexico to Venezuela. A slender annual, simple or with a few branches, glabrous; leaves alternate, linear, 5–12 mm. long; racemes head-like, 6–12 mm. long, the flowers purple, 5 mm. long; capsule 3 mm. long.

Polygala paniculata L. *Canchalagua*. *P. paniculata* f. *humilis* Chod. Bull. Soc. Bot. Belg. 30, pt. 1: 301. 1891 (La Sabana to San José, *Pittier 3212*); *P. paniculata* var. *verticillata* Chod. op. cit. 302. (pastures, Uruca, *Biolley 998*). Common in pastures and other grassy places, Meseta Central to the coasts, sometimes in cultivated ground. A species of wide distribution in tropical America. A slender annual 10–30 cm. high, branched, glandular; leaves almost

all alternate, linear, 8–15 mm. long; flowers 2–2.5 mm. long, purple, the racemes short or elongate; capsule 1.7 mm. long. The most common species of the genus in Central America. A frequent form with white flowers is f. *leucoptera* Blake. Pittier states that the plant sometimes is called Ipecacuana.

Polygala Timoutou Aubl. La Palma de San Ramón, *Brenes 3780*. Extending to Amazonian Brazil. A slender, erect annual 8–15 cm. high; leaves mostly ternate, oval or obovate, acutish, 5–9 mm. long; racemes short and dense, 1–3.5 cm. long, 5–6.5 mm. thick, the flowers purplish or greenish.

Polygala variabilis HBK. Reported from Guanacaste by Chodat. Mexico to northern South America. A slender annual, somewhat glandular; leaves alternate, linear, 3.5–9 mm. long; flowers purple, 3–3.5 mm. long, the racemes head-like, 3–7 mm. long; capsule 2.5–3 mm. long.

SECURIDACA Jacq.

Scandent shrubs; leaves alternate, broad, short-petiolate; flowers medium-sized, pink, in terminal and axillary racemes, these often paniculate; sepals 5, free, the 2 inner ones petaloid; petals 3, united at the base; stamens 8; fruit a samara, terminated by a broad wing.—Four species are known from Central America. The vines are handsome plants, with their abundant, pink blossoms, which in their form suggest the family Leguminosae, with which the plants usually are associated by those who have not made their acquaintance previously.

Securidaca diversifolia (L.) Blake. Common in forest and thickets of the coasts. A species of wide distribution. A small vine, or sometimes climbing over tall trees; leaves ovate to oblong, 4–10 cm. long, obtuse or acute, strigillose beneath; racemes terminal or axillary and solitary, 6–14 cm. long; ovary pubescent; samaras 4–6 cm. long.

Securidaca Micheliana Chodat, Bull. Herb. Boiss. 3: 543. 1895. *Elsota Micheliana* Blake, N. Amer. Fl. 25: 371. 1924. Atirro, Prov. Cartago, 600 meters, *J. D. Smith 5112*. Known only from the original collection. Leaves elliptic, 5–9 cm. long, short-acuminate, strigillose; racemes fasciculate, axillary, 1–2 cm. long; ovary glabrous.

Securidaca sylvestris Schlecht. *Elsota sylvestris* Kuntze. Thickets of the Pacific slope. Ranging to Mexico. Similar to *S. diversifolia*, but the leaves pubescent or pilosulous beneath.

DICHAPETALACEAE

Reference: Gleason, N. Amer. Flora 25: 381. 1924.

A single genus is represented in Central America.

DICHAPETALUM Thouars

Only the following species are known from Central America.

Dichapetalum Donnell-Smithii Engler. *Symphyllanthus Donnell-Smithii* Gleason. Quebradas at La Ventolera, southern slope of Poás, 1,700 meters; region of San Ramón. Panama to British Honduras. A shrub or tree of 6 meters or less; leaves alternate, petiolate, oblong to obovate, 7–20 cm. long, acute or acuminate, entire, densely pubescent or almost glabrous; flowers small, white, in axillary cymes, the peduncle united with the base of the petiole; petals and sepals 5, free; stamens 5; fruit a tomentose drupe 1.5–2 cm. long, containing a single seed. The plant is variable in pubescence and leaf form, and it may be that the material referred to it at present represents more than one species.

Dichapetalum Nevermannianum Standl. & Valerio, sp. nov. —Frutex gracilis 2.5 m. altus, ramulis pilis longis patentibus hirsutis; stipulae filiformes petiolum aequantes hirsutae; folia breviter petiolata membranacea, petiolo gracili hirsuto 3–4 mm. longo; lamina lineari-oblonga interdum supra medium paullo latior 7–13 cm. longa 1.5–2.7 cm. lata longe anguste attenuata, basi plus minusve inaequali late rotundata vel saepe breviter cordata, utrinque praesertim ad costam pilis longis rigidis patentibus hirsuta, nervis lateralibus angulo fere recto divergentibus; inflorescentiae ut videtur simpliciter racemosae terminales pauciflorae (perfectae non visae), floribus breviter pedicellatis, bracteis parvis subulatis attenuatis; sepala ovali-ovata vix 1.5 mm. longa hirtella, petalis sepalis aequilongis glabris apice profunde bifidis; stamina petalis aequilonga, antheris minutis, filamentis crassiusculis glabris; stylus elongatus filiformis glaber, ovario dense piloso; fructus 1–3-locularis 12–15 mm. longus densissime brunneo-tomentosus.—Finca Montecristo, Río Reventazón, near El Cairo, Prov. Limón, *Standley & Valerio 48497* (type in Herb. Field Mus.). A plant very distinct from all the South American species that I have seen, because of its very narrow, linear-oblong leaves, rounded or somewhat cordate at the very base. The species is dedicated to Mr. Ferdinand Nevermann, whose hospitality we were enjoying when the specimens of the plant were collected.

EUPHORBIACEAE. Spurge Family

Reference: Pax. & Hoffmann, Pflanzenreich IV. 147. 1910–1924.

A very large family, composed of the most diverse plants; herbs, shrubs, or trees, sometimes scandent, usually with milky latex; leaves almost always alternate and simple, rarely compound; flowers commonly bisexual, on the same or different plants; fruit typically a 3-celled and 3-lobate capsule, but often very different; pubescence often of scales or stellate hairs.—Other genera are represented in Central America.

ACALYPHA L.

Herbs, shrubs, or small trees; leaves petiolate, dentate; flowers generally monoecious, the pistillate usually in elongate spikes, the flowers subtended by conspicuous, dentate, green, sessile bracts; staminate flowers in elongate, slender, ament-like spikes; fruit a small, 3-celled capsule.—Other species occur in Central America.

Acalypha arvensis Poepp. & Endl. Cultivated and waste ground of the tierra caliente. Mexico to Bolivia. A branched herb 20–40 cm. high; leaves ovate or rhombic, acute or obtuse, crenate; spikes axillary, the pistillate oblong, very dense, 1.5–3 cm. long, densely pilose. One Costa Rican collection has been referred to *A. alopecuroides* Jacq., a species that probably does not grow in the country.

Acalypha costaricensis (Kuntze) Knoblauch in Just, Jahresb. 19: 337. 1894. *Ricinocarpus costaricensis* Kuntze, Rev. Gen. 615. 1891. Type collected in Costa Rica by Kuntze. Common in thickets of the Atlantic plains. Extending to British Honduras and Guatemala. A slender shrub of 1–3 meters, sometimes herbaceous, simple or with few branches; leaves large, oblong to ovate, broadest above the middle, almost glabrous or soft-pubescent, coarsely and unequally dentate; staminate spikes very long, green or red; pistillate flowers pedicellate, in large, terminal panicles; capsule covered with spine-like tubercles.

Acalypha diversifolia Jacq. Abundant in thickets and forest of the tierra caliente; region of San Ramón. Widely distributed in tropical America. A slender shrub or tree of 2–8 meters; leaves short-petiolate, lance-oblong to oblong-elliptic, narrow-acuminate, axillary, elongate; bracts denticulate. A very common species of the Central American lowlands, and one of the most abundant shrubs of the region. The form with pubescent leaves is var. *leptostachya*

(HBK.) Pax & Hoffm.; that with glabrate leaves is var. *carpinifolia* (Poepp. & Endl.) Muell. Arg.

Acalypha Ferdinandi K. Hoffm. Region of San Ramón, 800 meters. Ranging to Guatemala. A slender shrub of 1.5–4 meters; leaves short-petiolate, oblanceolate-oblong, 9–12 cm. long, narrow-acuminate, narrowed toward the obtuse or cordate base, serrate, glabrous; pistillate spikes terminal, the bracts remote, reddish, 13–15-dentate.

Acalypha Ferdinandi var. **pubescens** K. Hoffm. Pflanzenreich IV. 147, xvi: 64. 1924. Sarapiquí, 800 meters, *Pittier 14151.* Forests of Guanacaste and of other parts of the tierra caliente. Extending to Guatemala. Differing from the typical form by the abundant pubescence of the leaves.

Acalypha hispida Burm. *Rabo de gato.* Cultivated frequently for ornament. Native of the East Indies. A shrub with green, broadly ovate, serrate, glabrate, acuminate leaves; flower spikes large and very showy, dense, pendent, red.

Acalypha indica L. var. **mexicana** (Muell. Arg.) Pax & Hoffm. *A. mexicana* Muell. Arg. Meseta Central, in waste ground or coffee plantations. The variety ranges to Mexico; the species is almost pantropic. A branched annual, the petioles elongate; leaf blades ovate, obtuse, 1.5–5 cm. long, serrate, almost glabrous; spikes axillary, very short, the bracts dentate.

Acalypha irazuensis Kuntze, Rev. Gen. 616. 1892. *Ricinocarpus irazuensis* Kuntze, loc. cit. Volcán de Irazú, 2,300 meters, *Kuntze.* Thickets and forest of the central region, 1,200–2,300 meters. Endemic. A branched herb a meter or less in height, pubescent; petioles elongate, the blades broadly ovate, 3–5 cm. long, acute, serrate; pistillate spikes terminal, short, dense, the bracts 3–7-lobulate.

Acalypha leptopoda Muell. Arg. Common in thickets and forest, Meseta Central to the coasts; region of San Ramón. Mexico to Panama. A slender shrub of 1.5–3 meters; petioles elongate, the blades ovate, narrow-acuminate, cordate or rounded at the base, serrate, pubescent or almost glabrous; spikes axillary, the pistillate pedunculate, with only 1 or 2 bracts, these 13–17-dentate. The form with very pubescent leaves is var. *mollis* Muell. Arg.; that with glabrous leaves is var. *glabrescens* Muell. Arg.

Acalypha macrostachya Jacq. Forest and thickets, Meseta Central to the coasts. Widely distributed in tropical America. A shrub of 2–4.5 meters; petioles very long, the blades broadly ovate, 15–25 cm. long, acuminate, densely villous, crenate or serrate; spikes axillary, to 40 cm. long; bracts 13–25-dentate; styles bright red.

Acalypha obtusifolia Pax & Hoffm. Pflanzenreich IV. 147, xvi: 147. 1924. Forests near Punta Mala, Pacific coast, *Tonduz 6823*. Known only from the original collection. Similar to the last preceding species; leaves obovate, 10–12 cm. long, obtuse, almost glabrous.

Acalypha Pittieri Pax & Hoffm. Pflanzenreich IV. 147, xvi: 18. 1924. Cocos Island, *Pittier 16246*. Known only from the original collection. Petioles very long, the blades ovate, 20 cm. long, acuminate, crenate-serrate, villous; pistillate spike 7 cm. long, the bracts small, 1-flowered. The type collection has been referred to *A. bisetosa* Spreng.

Acalypha polystachya Jacq. Reported from Nicoya. Ranging to Mexico. A branched annual, almost glabrous; petioles elongate, the blades ovate, acuminate, 10 cm. long, serrate; pistillate spikes terminal, dense, 1 cm. thick, the bracts 9–11-parted, the segments very narrow.

Acalypha radinostachya Donn. Smith, Bot. Gaz. 54: 243. 1912. Llanuras de Santa Clara, Prov. Limón, 300 meters, *J. D. Smith 6849*. Known only from the original collection. Plants suffruticose, almost a meter high, simple; petioles elongate, the blades oblong-ovate, 14 cm. long, acuminate, rounded and somewhat cordate at the base, strigillose, crenate-serrate; pistillate spikes terminal, 30 cm. long, the bracts glandular, 2–3-denticulate.

Acalypha villosa Jacq. Common in forest and thickets of the Atlantic coast, ascending to the Meseta Central. Widely dispersed in tropical America. A shrub of 2–4.5 meters; petioles elongate, the blades ovate, 8–20 cm. long, acuminate, cordate at the base, crenate, softly pubescent or almost glabrous beneath; pistillate flowers pedicellate, racemose or paniculate, the bracts minute; capsule covered with spine-like tubercles. The plant is highly variable in pubescence.

Acalypha Wilkesiana Muell. Arg. Planted in almost all regions for ornament. Native of the Pacific islands. A shrub, noteworthy for its variously colored, usually reddish or purple leaves, which often are blotched with white or pink.

ADELIA L.

Two other species are known from Central America.

Adelia triloba (Muell. Arg.) Hemsl. Common in forest and thickets of the tierra caliente. Panama to Mexico. A shrub or tree of 3–9 meters, the branches often spinose; leaves oblong to obovate, 5–15 cm. long, narrow-acuminate, entire, almost glabrous but barbate beneath in the axils of the nerves; flowers dioecious, small, greenish, clustered in the leaf axils, the pistillate pedicels very long; fruit a trilobate capsule 1 cm. long.

ALCHORNEA Swartz

Shrubs or trees; petioles elongate, the blades dentate; flowers monoecious or dioecious, apetalous, in simple or paniculate spikes, the staminate spikes axillary, the pistillate terminal; fruit a 2–3-celled capsule.—Another Central American species occurs in Guatemala.

Alchornea costaricensis Pax & Hoffm. Pflanzenreich IV. 147, vii: 235. 1914. El Palmar de Boruca, *Tonduz 6757*. Common in forests of the coasts. Also in Panama. A tree of 4.5–12 meters, almost glabrous; leaves oblong or oblong-ovate, 8–12 cm. long, narrow-acuminate, 3-nerved at the base, dentate. Probably not distinct from *A. glandulosa*.

Alchornea glandulosa Poepp. & Endl. var. **Pittieri** Pax, Pflanzenreich IV. 147, vii: 235. 1914. *A. Pittieri* Pax, Bot. Jahrb. 33: 291. 1903. Valley of Agua Buena, Cañas Gordas, 1,100 meters, *Pittier 11101*. Known only from the original collection. The typical form of the species is South American. Leaves membranaceous, oblong-elliptic, 9–15 cm. long, acute, sparsely stellate-pubescent on both surfaces.

Alchornea latifolia Swartz. *A. platyphylla* Muell. Arg. Forests of the tierra caliente; region of San Ramón. Widely distributed in tropical America. A tree of 5–10 meters or more, almost glabrous, the scant pubescence of minute, stellate hairs; leaves elliptic or ovate, 10–25 cm. long, short-acuminate; capsule 1 cm. long. A Costa Rican collection has been referred to *A. grandiflora* Muell. Arg.

CAPERONIA St. Hil.

A few other species are reported from Central America.

Caperonia palustris (L.) St. Hil. Swampy places of the Pacific tierra caliente, and probably also of the Atlantic. Widely distributed

in tropical America, but not common in Central America. A perennial herb, branched, setulose; leaves lanceolate to elliptic, 5–12 cm. long, petiolate, serrate; flowers small, monoecious, in short, axillary racemes; capsule 6 mm. long.

CLEIDION Blume

Another Central American species is found in Panama.

Cleidion nicaraguense Hemsl. Forests of Talamanca and Guanacaste. Also in Nicaragua. A slender shrub of 3–4.5 meters, almost glabrous; leaves very shortly petiolate, membranaceous, oblong-lanceolate, 10–18 cm. long, narrow-acuminate, crenate-serrate, penninerved; staminate flowers almost minute, in short, axillary racemes. The generic position of this plant is uncertain, and it may well be that it is not a species of *Cleidion*.

CODIAEUM Juss.

Codiaeum variegatum (L.) Blume. An ornamental shrub, planted in almost all regions, but abundantly in the tierra caliente. Native of the Pacific islands. The plant is noteworthy for its variable leaves, linear to obovate, and green, red, pink, yellow, or white, in various combinations.

CROTON L.

Herbs, shrubs, or trees; pubescence generally of scales or stellate hairs; flowers greenish or whitish, racemose, the pistillate flowers at the base of the raceme, the staminate above; fruit a trilobate capsule.—Numerous other species of this vast genus are known from Central America.

Croton brevipes Pax, Bot. Jahrb. 33: 290. 1903. Río del Convento, Diquís Valley, 200 meters, *Pittier 12117*. Known only from the original collection. A shrub, forming thickets; leaves very shortly petiolate, oblong, acuminate, 10–14 cm. long, 3–4 cm. wide, crenate-dentate, sparsely pubescent with small, stellate hairs; flower spikes 2–3 cm. long, the flowers few and remote.

Croton costaricensis Pax in Pittier, Prim. 2: 231. 1900. *Targuá*. Piedra Blanca, *Tonduz 1284*. Common in thickets of the Meseta Central, 1,100–1,500 meters; Guanacaste. Endemic. A shrub of 1–3 meters, the branches villous with long hairs; petioles short or elongate, the blades ovate, tomentose and hispid, acute, subcordate at the base, penninerved. Well marked by the long hairs of the young branches.

Oxydectes costaricensis Kuntze, Rev. Gen. 614. 1891. *Croton costaricensis* Kuntze, loc. cit., in syn. Type locality described as "between Cartago and the east coast, 4,000 meters," an expression that is not intelligible, considering the elevation indicated. I have seen no authentic material of the species, which Kuntze considered to be related to *Croton flavens* L. At any rate, Kuntze's specific name is preoccupied. Without knowing more about the plant, it is not advisable to give it a new name.

Croton glabellus L. *Copalchí, Quizarrá copalchí.* Common in forests of the tierra caliente; San Ramón. A species of wide distribution in tropical America. A tree of 3–9 meters or more, aromatic, the pubescence of minute, brown scales; leaves short-petiolate, oblong or oblong-elliptic, 10–15 cm. long, acuminate, entire, penninerved; flowers greenish white, in long, slender spikes; capsule tuberculate. The strong, fine-grained, and durable wood is used commonly in house construction, especially for flooring. Pittier reports the Bribrí name as Mrús.

Croton glandulosus L. Grassy places or in thickets, Meseta Central to the Pacific coast. Widely distributed in tropical and subtropical America. An annual or perennial herb, densely hirsute, the hairs somewhat irritant; leaves petiolate, crenate; spikes short and dense.

Croton gossypiifolius Vahl. *Targuá, Targuá colorado.* Common in thickets and forest, sometimes forming almost pure stands of considerable extent, central region (ascending to 1,600 meters) to the coasts. A species of wide distribution. A shrub or tree of 1.5–9 meters, aromatic, the sap turning red when exposed to the air; petioles elongate, the blades ovate to almost rounded, large, 30 cm. or more in length, acuminate, rounded to deeply cordate at the base, densely stellate-tomentose, whitish beneath; flower spikes very long, the flowers very numerous, the pistillate and staminate flowers arising from the same node in the lower part of the spike. The wood is white, weak, and of little use. A gum that exudes from the trunk is said to be employed for cleaning the teeth. The following Indian names are reported: Dará-krú (Cabécara); Eskuat-krá (Brunka); Shkin (Térraba).

Croton Grosseri Pax, Bot. Jahrb. 33: 290. 1903. Carrillo, *Pittier 1206.* A shrub, the branches lepidote and stellate-pilose; leaves broadly lanceolate, 10–15 cm. long, acuminate, obtuse at the base, stellate-tomentose and somewhat lepidote; racemes paniculate. I

have seen no specimens of this species, which is known only from the original collection.

Croton Hoffmanni Muell. Arg. Linnaea 34: 86. 1865. *Terré. Oxydectes Hoffmanni* Kuntze, Rev. Gen. 612. 1891. Published with two varities: *incanus*, based upon *Hoffmann 547* from San José, the leaves hirtous-pubescent above; and *viridis*, *Hoffmann 548*, with leaves green above. Common in forest and thickets of the Meseta Central; also at Tuis. Endemic. A shrub of 1.5–3 meters; petioles elongate, the blades broadly ovate, large, denticulate or almost entire, acuminate, densely stellate-tomentose beneath; tomentum of the branches short and brown; flower spikes slender, very long, the clusters of flowers remote.

Croton Jimenezii Standl. & Valerio, sp. nov.—Frutex vel arbor, ramulis densiuscule pilis minutis stellatis brunneis onustis, interdum hirsutis; folia magna longe petiolata, lamina ovata vel oblongo-ovata longe anguste attenuato-acuminata, basi trinervia rotundata vel breviter cordata, supra viridi sparse minute stellato-puberula atque interdum sparse hirtella, subtus fere concolore densius minute stellato-pubescente, ad margines minute glanduloso-crenata vel subintegra; racemi densiuscule multiflori elongati stellato-tomentulosi et sparse hirsuti, pedicellis gracilibus 2–4 mm. longis; sepala floris masculi 3 mm. longa, dense pilis minutissimis stellatis brunneis obtecta, petalis sepalis aequilongis margine villosis, staminibus numerosis; flores femini pauci ad nodos infimos solitarii, brevius pedicellati, sepalis crassis nervosis acutis 6–7 mm. longis; capsula dense minute stellato-tomentosa.—La Palma, Prov. San José, 1,600 meters *Standley & Jiménez 33204* (type in Herb. Field Mus.); Las Nubes, Prov. San José, 1,500–1,900 meters, *Standley 38683*, *38792*, *38854*, *38745*. Río Reventado, north of Cartago, 1,500 meters, *Standley & Valerio 49478*. Known by the name of Targuá.—A shrub or tree of 3–9 meters, well marked by its pubescence of minute, brown hairs; leaves 10–20 cm. long, 5–12 cm. wide; racemes 15–20 cm. long or more, the flowers whitish, very numerous and dense in the racemes. A common tree of wet forests of the upper zone of the central volcanoes, ascending to a greater elevation than other Costa Rican species.

Croton lobatus L. Reported from Boruca. Widely distributed in tropical America. An annual herb a meter high, distinguished from other Costa Rican species by its deeply trilobate leaves.

Croton niveus Jacq. *Copalchí.* Common in thickets of the Meseta Central, and in Guanacaste. Widely dispersed in tropical America. A shrub or tree of 1.5–6 meters, sometimes forming almost pure thickets, the pubescence of minute, silvery scales; petioles elongate, the blades broadly ovate, acuminate, 3-nerved, entire; capsule almost smooth, covered with scales. It is said that this species is employed in domestic medicine.

Croton panamensis Muell. Arg. *Targuá.* Dry forests of Guanacaste. Panama to Mexico. A shrub of 2.5–4.5 meters; petioles elongate, the blades ovate, large, green above, finely stellate-tomentose beneath, acuminate, crenulate; racemes short or elongate, with pistillate and staminate flowers arising from the same lower nodes. This species is known in Panama by the name Sangrillo.

Croton Pittieri Pax in Pittier, Prim. 2: 328. 1900. *Carré.* Río María Aguilar, near San José, *Biolley 6959.* Thickets of the regions of Cartago and San José. Endemic. A shrub; petioles short or elongate, the blades lanceolate or ovate-lanceolate, narrow-acuminate, penninerved, green above, pale and densely stellate-tomentose beneath; flower spikes short and dense; calyx of the pistillate flowers glandular-pilose. The species is well marked by its narrow leaves.

Croton punctatus Jacq. *C. maritimus* Walt. Common on beaches of the Atlantic coast. Widely distributed in tropical America; one of the most characteristic plants of beaches. A shrub or herb 1 meter or less in height, the pubescence of silvery or brown scales; leaves oval or oblong, 2–4 cm. long, rounded at the apex, entire.

Croton pungens Jacq. was reported from Costa Rica by Hemsley, but it is uncertain to which, if any, of the species listed here the material so reported belongs.

Croton reflexifolius HBK. El Alto, 1,500 meters; Guanacaste. Mexico to Colombia. A small tree, similar to *C. niveus*, but the capsules conspicuously tuberculate. This species and *C. niveus* differ only in the form of capsule. I have seen only a single Costa Rican collection with capsules, and this belongs to *C. reflexifolius*. It is uncertain whether all the collections referred here to *C. niveus* are referable to *C. reflexifolius*, or if some actually represent the former species. Both sometimes grow in the same region in other parts of Central America. *C. reflexifolius* is employed commonly in Salvador for hedges, especially for wind-breaks to protect coffee plantations. It is used also as a febrifuge and tonic.

Croton rhamnifolius HBK. var. **caudatus** Pax in Pittier, Prim. 2: 331. 1900. Bahía de Salinas, *Tonduz 2766*. Known only from the original collection. The typical form of the species has a wide distribution in tropical America. A slender shrub; petioles elongate, the blades ovate, narrow-acuminate, green above and pilose with simple hairs, beneath stellate-pubescent.

Croton Tonduzii Pax in Pittier, Prim 2: 330. 1900. *Copalchí, Quina amarga.* Palmares de El General, 600 meters, *Pittier 3474*. An endemic species of the forests of the Diquís Valley. A shrub or small tree, the pubescence of minute scales; petioles elongate, the blades ovate, 10–15 cm. long, acute, dentate, 3-nerved, pale beneath. An infusion of the bark is employed as a remedy for fevers.

Croton tragioides Blake. Savannas of Boruca. Panama to southern Mexico. An annual herb 30–60 cm. high, stellate-pubescent; leaves ovate, 2–3.5 cm. long, crenate.

Croton turrialva Kuntze, Rev. Gen. 614. 1891, in syn. *Oxydectes turrialva* Kuntze, loc. cit. At the base of Volcán de Turrialba, *Kuntze 2238*. Known with certainty only from the original collection. A shrub of 3–4 meters, stellate-tomentose; leaves ovate, short-petiolate, narrow-acuminate; racemes long, the flowers few and remote. Known to the writer only from a photograph of the original collection. It may be identical with *C. Pittieri*.

Croton xalapensis HBK. *Terré, Targuá, Targuá blanco.* Common in the Meseta Central, especially in the region of Cartago, and extending to the tierra caliente, sometimes forming almost pure thickets of wide extent. Mexico to South America. A shrub or tree of 1.5–6 meters; petioles elongate, the blades ovate or oblong-ovate, very large, densely stellate-tomentose, pale beneath, acuminate, crenulate; racemes elongate.

DALECHAMPIA L.

Herbaceous vines; petioles long, the blades simple, trilobate, or triparted; flowers monoecious, in pedunculate clusters subtended by 2 large, green or colored bracts; pistillate sepals pectinate and usually covered with urticant hairs.—Other species are known from Central America.

Dalechampia dioscoreifolia Poepp. & Endl. Common in forest and thickets of the tierra caliente. Ranging to Peru. Leaves ovate, short-acuminate, deeply cordate at the base or truncate,

denticulate or almost entire; bracts large, pink. The plant is rather showy because of the prettily colored bracts.

Dalechampia heteromorpha Pax & Hoffm. Pflanzenreich IV. 147, xii: 26. 1919. Río Grande, San Ramón, 950 meters, *Brenes 14414*. Known only from the region of San Ramón. Leaves of 2 forms, some composed of 3 leaflets, others simple and rounded-ovate; bracts 2.5 cm. long, denticulate. Perhaps not distinct from *D. panamensis*.

Dalechampia panamensis Pax & Hoffm. Common in forest and thickets of Guanacaste, and in the Atlantic coast; San Ramón. Guatemala to Panama. Leaves with 3 leaflets, these lanceolate, acuminate, the 2 lateral ones very unequal at the base; bracts green.

Dalechampia scandens L. Thickets of the Pacific tierra caliente. Widely distributed in tropical America. Leaves deeply trilobate, soft-pubescent; bracts large, green.

Dalechampia tiliifolia Lam. Common in thickets of the Pacific tierra caliente. Widely dispersed in tropical America. Leaves deeply trilobate, densely pubescent; bracts 3–6 cm. long, yellowish white. The plant is showy and not unattractive when covered with the handsomely colored bracts.

DYSOPSIS Baill.

The genus consists of a single species.

Dysopsis glechomoides (Rich.) Muell. Arg. Wet forests of Cerro de Las Vueltas, 3,000 meters. Also in Ecuador and Chile. A low, slender and somewhat pubescent herb; leaves petiolate, almost rounded, 1–2 cm. long, crenate; flowers minute, monoecious, axillary; fruit a small capsule. In general appearance the plant suggests a *Pilea*.

EUPHORBIA L. Spurge

Herbs, shrubs, or small trees; leaves alternate, opposite, or verticillate, entire or dentate, sometimes lobate; flowers small, surrounded by an involucre that resembles a calyx or corolla; fruit a small, 3-celled capsule.—A vast genus, represented in Central America by relatively few species.

Euphorbia brasiliensis Lam. In dry or waste places, Pacific tierra caliente. Widely distributed in tropical and subtropical America. Plants annual, erect or ascending, glabrous throughout;

leaves opposite, oblong or oval, 2–3 times as long as broad, serrate; flowers in terminal cymes; seeds black.

Euphorbia cotinifolia L. *Barrabás.* Tierra caliente, but not common. Mexico to northern South America. A shrub or tree of 2–6 meters, glabrous; petioles long and slender, the leaves verticillate, the blades rounded, entire; flowers in terminal cymes; appendages of the involucre white. The milky sap of the plant is highly poisonous, in contact with the skin. Pittier reports the Térraba name of Horla.

Euphorbia densiflora (Kl. & Garcke) Klotzsch. *Golondrina.* Common in grassy or waste places, Meseta Central to the coasts. A species of wide distribution in tropical America. A small, prostrate herb, densely pubescent; leaves opposite, broadly oblong, obtuse or acute, dentate, short-petiolate; appendages of the involucre red or pink and petal-like.

Euphorbia graminea Jacq. *Adenopetalum Hoffmanni* Kl. & Garcke, Abh. Acad. Berlin 47. 1860 (type collected by *Hoffmann*); *A. boerhaviifolium* Kl. & Garcke, loc. cit. (Volcán de Irazú, *Oersted*); *A. subsinuatum* Kl. & Garcke, op. cit. 48 (type collected by *Hoffmann*); *A. discolor* Kl. & Garcke, op. cit. 49 (Cerro de Aguacate and near San José, *Oersted*); *A. pubescens* Kl. & Garcke, loc. cit. (Agua Caliente, *Oersted*); *A. irasuense* Kl. & Garcke, op. cit. 50 (Volcán de Irazú, *Oersted*); *E. graminea* var. *acutifolia, E. graminea* var. *subsinuata, E. boerhaviifolia, E. discolor* Boiss. in DC. Prodr. 15, pt. 2: 54. 1862. Common in thickets of the Meseta Central and Pacific tierra caliente. Widely distributed in tropical America. Plants herbaceous, annual, very variable, glabrous or pilose; leaves chiefly verticillate, lanceolate to broadly ovate, acute or rounded at the apex, entire or dentate; bracts of the inflorescence small, usually white; involucres with white, petal-like appendages. This plant is highly variable in pubescence and leaf form, but it is probable that all the numerous forms represent a single species.

Euphorbia heterophylla L. *Golondrina* (San José). Common in grassy or waste places, Meseta Central to the coasts. An annual herb, erect, simple or branched, pubescent; leaves mostly alternate, linear to oblong or ovate, entire, lobate, or dentate, those of the inflorescence usually whitish or pink near the base. This species, also, is an extremely variable one.

Euphorbia hirta L. *Golondrina.* Abundant, especially about dwellings, and usually in cultivated and waste ground, Meseta

Central to the coasts. Almost pantropic in distribution; one of the most abundant plants of Central America. An erect or ascending herb of 30 cm., densely pubescent; leaves opposite, short-petiolate, ovate or oblong, 1–3 cm. long, acute, dentate; involucres in small, axillary cymes; capsule pubescent. This is one of the common plants that is believed to harbor the minute organisms causing tropical ulcers, especially those on children's legs.

Euphorbia Hoffmanniana (Kl. & Garcke) Boiss. in DC. Prodr. 15, pt. 2: 99. 1862. *Lechilla. Euphorbiastrum Hoffmannianum* Kl. & Garcke, Abh. Acad. Berlin 101. 1860. Near San José, *Hoffmann.* Common in thickets, and especially in hedges, throughout the Meseta Central, 1,100–1,800 meters; San Ramón. Endemic. A glabrous shrub of 1–2.5 meters; leaves alternate, with long, slender petioles, the blades ovate or obovate, obtuse or acute, entire; involucres solitary or clustered in the leaf axils. The latex of the leaves is acrid and poisonous.

Euphorbia hypericifolia L. Common in cultivated and waste ground of the tierra caliente. Generally distributed in tropical America. An erect, glabrous annual; leaves short-petiolate, oblong, opposite, obtuse, denticulate, pale beneath; involucres green, arranged in small, axillary cymes; capsule glabrous; seeds reddish brown. Reported from Costa Rica as *E. nutans* Lag.

Euphorbia hyssopifolia L. Guanacaste, and probably in other regions. Widely dispersed in tropical America. Similar to the last species, but the leaves linear and elongate.

Euphorbia lasiocarpa Klotzsch. Grassy places, Meseta Central to the Pacific coast. Widely distributed in tropical America. An erect annual or perennial, pubescent; leaves opposite, short-petiolate, small, denticulate, rounded or obtuse at the apex; involucres in small cymes; capsule pubescent.

Euphorbia ocymoidea L. Colinas de San Pedro de San Ramón, *Brenes 16711.* Widely distributed in tropical America. A slender, much branched annual, the stems glabrous, erect; leaves alternate, ovate-rounded, obtuse or rounded at the apex, small, thin, entire, paler beneath, sparsely pilose with slender hairs, on long, slender petioles; involucres small, green, pilose.

Euphorbia Oerstediana (Kl. & Garcke) Boiss. in DC. Prodr. 15, pt. 2: 59. 1862. *Poinsettia Oerstediana* Kl. & Garcke, Abh. Acad. Berlin

103. 1860. Naranjo, *Oersted.* Known in Costa Rica only from the original collection. Also in the West Indies. An erect herb; leaves alternate, but opposite or verticillate at the tips of the branches, ovate or elliptic, entire, puberulent beneath or almost glabrous; involucres in terminal cymes; capsule puberulent.

Euphorbia pulcherrima Willd. *Pastora.* Planted almost everywhere for ornament, and sometimes naturalized about dwellings. An American plant, but probably now unknown in a truly wild state; cultivated in almost all tropical regions. A shrub or small tree, noteworthy for the large, bright red leaves that surround the inflorescence. It usually flowers in December, on account of which it is known in many parts of Central America as Flor de Pascua. It is grown abundantly in hothouses of the North, especially for sale at Christmas, being known there by the name Poinsettia, a generic name sometimes given to one group of *Euphorbia* species. There are cultivated forms with pale yellow or almost white bracts.

Euphorbia Schlechtendalii Boiss. Region of San Ramón, also in Guanacaste; collected only by Brenes. Extending to Mexico. A shrub a meter high or more, glabrous throughout or nearly so; leaves small, long-petiolate, entire, verticillate, orbicular to ovate, 1–5 cm. long, rounded to acutish at the apex; involucres in terminal cymes, the appendages of the glands very narrow.

Euphorbia splendens Bojer. *Corona de Cristo.* A woody, exotic plant, sometimes planted in gardens. Noteworthy for its tortuous and often scandent, very spiny, woody stems, and for the showy, bright red involucres.

Euphorbia thymifolia L. *Golondrina.* Common in waste places, often growing in streets, Meseta Central to the coasts. A species of wide distribution. A prostrate annual, somewhat pubescent; leaves small, oblong, opposite, denticulate, 7–12 mm. long; involucres minute, axillary, the appendages minute, inconspicuous.

Euphorbia Valerii Standl. Journ. Wash. Acad. Sci. 17: 11. 1927. Forests of Los Ayotes, near Tilarán, Guanacaste, 700 meters, *Standley & Valerio 45338.* Also Cataratas de San Ramón, *Brenes.* Endemic. A shrub of 3–4.5 meters with few thick branches, glabrous; leaves alternate; flowers in large, axillary cymes.

GARCIA Rohr

The genus consists of a single species, which ranges widely in tropical America.

Garcia nutans Rohr. Forests of Nicoya and Guanacaste. Mexico to Colombia and West Indies. An almost glabrous shrub or tree; leaves coriaceous, petiolate, penninerved, entire, oblong or obovate-oblong, 10–20 cm. long; flowers monoecious, petaliferous, 1–3 at the apex of the branch, 8–12 mm. long; capsule trilobate, 2.5 cm. broad, glabrous. This tree is known in Guatemala by the names Huevo de gato and Cojón de gato.

It is probable that the Para rubber tree, *Hevea brasiliensis* Muell. Arg., that furnishes most of the rubber of commerce, is planted as a curiosity in some part of Costa Rica. It is native of the Amazonian region, but at present is planted on a large scale in the East Indies.

HIERONYMA Allemão

Trees, the indument of small scales; leaves alternate, penninerved, petiolate, entire, the stipules large or small; flowers small, dioecious, in axillary panicles or racemes, apetalous; stamens 3–6; fruit a small drupe, usually 1-seeded.—No other species are known from Central America.

Hieronyma alchorneoides Allemão. Forests of the Atlantic tierra caliente. British Honduras to Brazil. A tree of 30 meters or less; stipules large and conspicuous, ovate-rounded; leaves very large, elliptic, acuminate, 15–30 cm. long, green, the scales minute and distant; drupes 4–5 mm. long. The wood is reddish brown, rather hard and heavy, and difficult to work. In some regions it is employed for general construction and cabinetwork. In Panama the tree is called Pilón and Zapatero.

Hieronyma guatemalensis Donn. Smith. Naranjo, 1,650 meters. Also in Guatemala. A small tree, the stipules small and narrow; leaves oblong to obvate, 7–11 cm. long, acuminate, completely covered beneath with pale scales.

Hieronyma oblonga (Tulasne) Muell. Arg. Río Navarro and Diquís Valley. Mexico to Brazil. A small tree, the stipules small; leaves oblong to obovate or elliptic, 7–15 cm. long, acuminate, the scales few and remote, or sometimes denser.

Hieronyma poasana Standl., sp. nov. *Llorón colorado.*—Arbor 5–7-metralis, stipulis lanceolato-oblongis 6 mm. longis; folia parva, petiolo 1–2 cm. longo, lamina obovata vel elliptico-obovata 6–8.5 cm. longa 3–5 cm. lata, apice obtusa vel rotundata et breviter abrupte

acuminata, basi obtusa vel cuneato-acuta, supra viridi sparse minute lepidota asperula, subtus brunnescente dense lepidota ad costam dense brunneo-pilosa; paniculae masculae pauciramosae 4–6 cm. longae densissime lepidotae, floribus breviter pedicellatis.—Volcán de Poás, near La Lechería, 2,150 meters, *G. Cufodontis 592* (Herb. Field Mus., type); Poás, between La Lechería and the Hotel, 2,100–2,600 meters, *Standley 34835;* La Palma de San Ramón, 1,050 meters, *Brenes 5601, 5818.* A tree of 9–12 meters with broad crown; similar to *H. guatemalensis,* but differing in the abundant hairs along the costa of the leaf. In *H. guatemalensis* there are only scales and no hairs on the lower leaf surface.

HIPPOMANE L. Manchineel

The genus contains a single species.

Hippomane Mancinella L. *Manzanillo de playa.* Common along the Pacific beaches, and probably also on the Atlantic coast. Widely distributed in tropical America. A small tree, usually forming narrow thickets along the beaches, the bark smooth and pale brown; leaves alternate, long-petiolate, the blades broadly ovate, glabrous, finely serrate; flowers green, in thick spikes; fruit resembling a small, green apple, 2.5 cm. or more in diameter. The Spanish conquistadores, upon discovering this tree, believed they had found apples in the New World, and ate the fruits, sometimes with fatal results. After becoming acquainted with the poisonous properties of the tree, they gave it the most fantastically evil reputation, stating that if a person should sit or even pass beneath the tree he would lose his sight or even his life. There is no doubt that the latex is irritant, sometimes producing painful inflammation of the skin, and that smoke arising from the burning wood sometimes injures the eyes seriously. It is reported that the sap was employed by the Caribs for poisoning their arrows. The wood is yellowish brown, striped with brown and black, of medium hardness and weight, fine-grained, and durable. It is suitable for cabinetwork and other purposes.

HURA L. Sandbox tree

Tall trees, the bark pale, covered with low, sharp, hard prickles; leaves alternate, stipulate, the petioles very long, the blades rounded-ovate, short-acuminate, cordate at the base, glabrous, dentate; flowers monoecious, the staminate in thick, terminal spikes, the pistillate sessile; stamens very numerous, verticillate; fruit a large, many-celled capsule 8–10 cm. broad.—The genus consists of the two

species listed here. The wood is pale yellow or white, soft, light in weight, and rather strong; it has few uses. These trees are among the largest of America, the trunk sometimes 1.5 meters or more in diameter and 20 meters high, with a huge, depressed crown. They are abundant almost everywhere in the tierra caliente but especially conspicuous on the dry hillsides of Guanacaste, where there are many giants. The fruit, when fully ripe and dry, explodes with a loud report, scattering to some distance the large seeds, which are solitary in each cell. The fruits, or probably rather the seeds, are much eaten by macaws. The seeds are sometimes used as a purgative by country people of the Pacific coast, but their use is dangerous, even in small doses. The latex that runs from the bark is caustic, and sometimes does much damage to eyes of men who cut the trees. It is utilized in some regions as a barbasco, for stupefying fish.

Hura crepitans L. *Javillo, Habillo.* Common in forests of the tierra caliente of both coasts. Widely distributed in tropical America. Stamens in 2 or 3 verticels.

Hura polyandra Baill. *Javillo, Habillo.* Forests of the coasts. Ranging to Mexico. Stamens in numerous verticels. The two species of the genus, although quite distinct in stamen characters, can not be distinguished except by those organs. Since it is difficult to obtain specimens with flowers, at present little is known of the distribution of the two species in Costa Rica or other parts of Central America. Pittier reports the following Indian names: Betshur (Bribrí); Tsu-krá (Brunka); Uí, Igún (Térraba).

JATROPHA L.

Herbs, shrubs, or small trees; leaves alternate, petiolate or sessile, entire, dentate, or lobate, often glandular; flowers monoecious, small or medium-sized, petaliferous or apetalous, usually in cymes; fruit capsular.—Other species are known from Central America.

Jatropha aconitifolia Mill. *Chicasquil.* Common in hedges and gardens, probably an introduced plant. Ranging to Mexico. A dense shrub of 3–5 meters with depressed crown, the bark pale gray; leaves large, divided into narrow, acute lobes, often provided with long, stinging hairs (these are absent in some forms of the species). This plant is well adapted to use as a hedge plant. The young shoots and leaves are cooked and eaten as a vegetable.

Jatropha Curcas L. *Tempate, Coquillo, Coquito.* Common in thickets of the Pacific tierra caliente, probably also on the Atlantic

coast. Widely dispersed in tropical America. A shrub or small tree; leaves large, somewhat 3–5-lobate or angled, entire, almost glabrous; flowers greenish yellow, in pedunculate cymes; fruit drupe-like, fleshy, the seeds 2 cm. long. This shrub, common in almost all parts of the Central American tierra caliente, often is planted for hedges. The large seeds contain 25 to 40 per cent of an odorless oil that has been used in some regions for making paints and soap and as a lubricant. They have an agreeable flavor but also such violent purgative properties that it is dangerous to eat them. It is said that they are edible when thoroughly roasted. The leaves are employed in Costa Rica as poultices for affections of the spleen and for erysipelas. Pittier reports the Brunka name of Kuubín-ua.

Jatropha gossypiifolia L. *Frailecillo.* Santo Domingo de Osa and region of San Ramón. Widely distributed in tropical America. A shrub of 1–2 meters; stipules dissected and glandular; leaves deeply trilobate, the lobes acuminate, serrate.

Jatropha multifida L. *Chicasquil.* Sometimes cultivated in gardens as an ornamental plant. Of American origin, but not a native of Central America. A shrub of 1–2 meters, simple or somewhat branched, glabrous; leaves deeply lobate, the lobes divided into numerous narrow segments; flowers red, in dense cymes terminating very long peduncles.

Jatropha podagrica Hook. Cultivated occasionally in gardens for ornament. A plant of American origin, known in Central America only in cultivation. Plants simple, less than a meter high, arising from a large, turnip-shaped root that is half exposed above the surface of the soil; leaves large, long-petiolate, pale beneath, 3–5-lobate and otherwise entire; flowers brilliant red. A showy and striking plant, usually known in Central America by the name Ruibarbo, although it has little similarity and no relationship with true rhubarb (*Rheum*; Polygonaceae).

Jatropha tubulosa Muell. Arg. Thickets of the Pacific coast. Mexico to Bolivia. A shrub or small tree, covered with long, stinging, stiff hairs; leaves large, pubescent, deeply lobate; flowers white; calyx of the pistillate flower persistent at the base of the capsule.

Jatropha urens L. Pacific coast. A species of wide distribution. An herb or low shrub, similar to the last species, but usually a much smaller plant; calyx of the pistillate flower deciduous. The hairs sting severely, the pain sometimes persisting for many hours or

even several days. Known in Panama by the names Ortiga and Pringamoza.

JULOCROTON Mart.

Three other species are recorded from Central America.

Julocroton argenteus Didrichsen. Dry thickets of Guanacaste. Mexico to Colombia. An erect herb 60–90 cm. high, pale, densely and finely stellate-pubescent, branched; leaves petiolate, broadly ovate, obtuse or rounded at the apex, dentate, palmately nerved; fruit capsular. In general appearance the plant suggests the genus *Croton*.

MABEA Aubl.

Shrubs or trees; leaves alternate, short-petiolate; flowers monoecious, apetalous, the staminate with numerous stamens inserted upon a convex receptacle, arranged in a long, narrow panicle, the bracts provided with 2 large and conspicuous glands; fruit capsular. —No other species are known from Central America.

Mabea montana Muell. Arg. Forests of the Pacific coast. British Honduras to Venezuela. A tree of 7 meters, glabrous outside the inflorescence, there with a pubescence of minute, stellate hairs; leaves oblong, narrow-acuminate, 2–3 cm. wide, finely serrate or almost entire, pale beneath; panicles about 2 cm. broad, the pedicels of the staminate flowers almost 1 cm. long; staminate flowers reddish, with about 14 stamens. One of the Costa Rican collections has been referred to *M. Piriri* Muell. Arg.

Mabea occidentalis Benth. Wet forest of the Atlantic coast. Mexico to Brazil. A slender shrub or tree of 2.5–6 meters, similar to the last species, the leaves larger, 3.5–6 cm. wide; panicles broader, the stamens 25–35; capsule 2.5 cm. long, tomentulose.

MANIHOT Adans.

Herbs or shrubs; leaves alternate, petiolate, usually deeply lobate, the stipules small; flowers monoecious, apetalous, rather large, racemose or paniculate; staminate calyx campanulate; stamens 10; fruit capsular.—There are probably other species in Central America.

Manihot carthaginensis (Jacq.) Muell. Arg. Thickets near Nicoya; Hacienda Catalina, Guanacaste. Mexico to Venezuela. Plants herbaceous or somewhat woody; leaves 5–7-lobate, the segments somewhat lobate; flowers 1 cm. long.

Manihot dulcis (Gmel.) Pax. *Yuca, Yuca dulce. M. palmata* Muell. Arg. Cultivated frequently, but much less common than *M. esculenta.* Leaves 3–13-lobate, glabrous; calyx 12–14 mm. long; capsule not winged. Very similar to *M. esculenta,* but without the poisonous properties of that species, the most conspicuous technical difference being the form of the capsule. The roots are used in the same manner as those of *M. esculenta.* For this species there are reported some Indian names whose application to it is not altogether certain: Shku (Cabécara); Ari (Bribrí); Unkah (Brunka); Ik (Térraba).

Manihot esculenta Crantz. *Yuca, Yuca amarga. M. utilissima* Pohl. Cultivated commonly for its edible roots; naturalized in some localities. Of South American origin. A tall herb, sometimes more or less woody, glabrous; leaves deeply 3–7-lobate, the segments entire; capsule 1.5 cm. long, with 6 longitudinal wings. Numerous varieties of the plant are recognized in Costa Rica. From earliest times the plant seems to have occupied among the Caribs the same place that was held among the natives of the interior and Pacific coast by maize. At present it is grown plentifully throughout the tierra caliente and much of the tierra templada. Over large areas of South America this is the most important food plant, filling the place held elsewhere by maize and wheat. The large roots, somewhat resembling sweet potatoes, are used also for the preparation of tapioca. There appear to be two distinct races of this species, one with sweet roots that are not poisonous and therefore not in need of special preparation before being eaten; and another race whose roots contain a poisonous property that it is necessary to remove or else destroy by heat. For this important plant various Indian names are reported: Ili, Ali (Bribrí); Shko (Cabécara); Shku (Estrella); Tátzica (Tucurrique); Crosho (Térraba); Li (Talamanca); Ung-cah (Boruca); Iya (Guatuso).

Manihot Glaziovii Muell. Arg. Occasionally planted about San José as an ornamental tree. Native of southern Brazil. A glabrous tree, differing from other species listed here in having peltate leaves that are deeply 3–5-lobate. This species supplies Ceara rubber, which formerly was of commercial importance.

There is little doubt that there grows in the Atlantic coast *Omphalea diandra* L., a somewhat scandent shrub with oblong-elliptic leaves, and capsules as large as an orange, but no Costa Rican specimens or reports have been seen.

PEDILANTHUS Poit.

A few other species are reported for Central America.

Pedilanthus tithymaloides (L.) Poit. *Bítamo, Bítamo real, Zapatilla.* Sometimes planted for hedges. Widely distributed in tropical America, at least in cultivation. A shrub of 1–2 meters, the stems succulent, deep green; leaves alternate, ovate, entire, almost sessile, caducous, the plant being leafless most of the time; flowers small, enclosed in a shoe-shaped involucre; fruit capsular. The latex that exudes when the stems are broken is corrosive. In some parts of Central America the plant is called Pie de niño.

PHYLLANTHUS L.

Herbs, shrubs, or small trees; leaves small or large, entire, usually distichous; flowers almost minute, apetalous, mostly solitary or fasciculate in the leaf axils; fruit capsular or rarely baccate, 3–10-celled.—Other species are known from Central America.

Phyllanthus acidus (L.) Skeels. *Grosella. P. distichus* Muell. Arg. Cultivated at Puntarenas, and doubtless elsewhere. Introduced from the Orient. A small tree, glabrous; leaves ovate, acute, 4–7 cm. long, the branchlets with their leaves resembling a compound leaf; flowers green, in panicles arising from naked branches. The fruit is a green, juicy berry that is intensely acid and about 2 cm. in diameter. It is edible when cooked. The grosella of Costa Rica is, of course, an altogether different plant from the grosella or currant of Spain, which is a species of *Ribes*.

Phyllanthus brasiliensis (Aubl.) Poir. *Chilillo, Gallina. P. Conami* Swartz; *P. acuminatus* Vahl. Common in thickets, Meseta Central to the coasts. Widely distributed in tropical America. A slender shrub or tree of 2–7 meters; leaves ovate, acuminate, almost glabrous; flowers green, small, pedicellate and fasciculate in the leaf axils; capsule 4 mm. long. The leaves are distichous, giving the large branches a fern-like appearance. This is one of the most abundant plants in clearings or abandoned land of the tierra caliente.

Phyllanthus carolinensis Walt. Grassy places, region of Cartago to the Atlantic coast. Widely distributed in tropical America. An erect herb 15–40 cm. high, glabrous, the branches angulate, almost erect, the lateral ones shorter than the main stem; flowers minute, almost sessile in the leaf axils.

Phyllanthus lathyroides HBK. Common in thickets and shady places, Meseta Central to the Atlantic coast; region of San Ramón. Generally distributed in tropical America. A slender, glabrous herb, erect or ascending; leaves oblong, obtuse, 5–10 mm. long, pale beneath; flowers pedicellate in the leaf axils; capsule 3–4 mm. wide.

Phyllanthus leptobotryosus Donn. Smith, Bot. Gaz. 54: 241. 1912, is a species of *Hyperbaena* (Menispermaceae), and should be known as **Hyperbaena leptobotryosa** (Donn. Smith) Standl., comb. nov. A synonym is *Hyperbaena isophylla* Standl. Field Mus. Bot. 8: 12. 1930. The species has been omitted from the treatment of the genus on page 436 of this volume.

Phyllanthus micrandrus Muell. Arg. One collection from the Escuela de Agricultura, San Pedro Montes de Oca, apparently is referable to this species. Probably it was taken from a cultivated plant, although it is difficult to understand why a plant so ordinary in appearance should be in cultivation. The species ranges from Mexico to Venezuela. A slender shrub or small tree; leaves orbicular or round-ovate, 1–3.5 cm. long, thin, glabrous, rounded at the apex; flowers very small, axillary, whitish.

Phyllanthus Niruri L. In shady, moist places, Meseta Central to the Atlantic coast. Almost pantropic in distribution. Similar to *P. lathyroides*, but the capsule smaller, only 2 mm. broad. This and *P. lathyroides* have slender, weak lateral branches that are horizontal or ascending, and altogether unlike the erect branches of *P. carolinensis*, which has similar leaves.

Phyllanthus nivosus W. G. Smith. Sometimes planted for ornament in the region of San José. Native of the South Sea Islands. A dense shrub with slender branches; leaves ovate-rounded, handsomely variegated with white.

Phyllanthus nobilis (L. f.) Muell. Arg. Common in thickets of the tierra caliente. Widely distributed in tropical America. A shrub or tree of 2–4 meters; leaves lance-oblong or elliptic-oblong, 5–10 cm. long, short-petiolate, acute or acuminate, glabrous or pubescent beneath; flowers clustered in the leaf axils, the pedicels long and slender.

Phyllanthus Pittieri Pax in Pittier, Prim. 2: 327. 1900. Agua Caliente, *Pittier 2505*. Region of San Ramón, at 1,100 meters. Endemic. A tree, related to *P. brasiliensis*, but the leaves elliptic, 3 cm. long, and obtuse.

Phyllanthus Valerii Standl., sp. nov.—Herbacea vel suffruticosa 1 m. alta ramosa, ramis rubescentibus minute puberulis; stipulae deciduae filiformes 2–3 mm. longae; folia 1 mm. longe petiolata oblonga 1.5–2.5 cm. longa 4–7 mm. lata obtusa, basi obtusiuscula et interdum paullo inaequalia, supra viridia subtus pallida, glabra; flores axillares solitarii, pedicellis crassiusculis 1–1.5 mm. longis; sepala 5 ovalia vel oblongo-elliptica 1.5 mm. longa apice rotundata glabra; capsula depresso-globosa 3.5 mm. lata glabra 6-locularis; semina ochracea laevia 1.8 mm. longa.—Wet forest, Yerba Buena, northeast of San Isidro de Heredia, 2,000 meters, *Standley & Valerio 49814* (type in Herb. Field Mus.).—A very distinct species, somewhat similar to *P. lathyroides*, but much larger in all its parts.

RICINUS L. Castor bean

The genus consists of a single species.

Ricinus communis L. *Higuerilla.* Naturalized in many localities of the tierra caliente and also in the tierra templada. Probably native of Africa, and perhaps brought to the New World by negro slaves. A large herb or a small tree, glabrous; leaves deeply lobate; flowers in dense, thick racemes; capsule usually covered with short, fleshy spines. Often planted for shade in new coffee plantations, and also known among the Indians, who light their dwellings with the seeds strung on slivers of wood. From the seeds is obtained castor oil (aceite de castor, aceite de ricino), employed in medicine as a purgative and also in industry for lubrication of machinery, soap manufacture, and dyeing of cotton goods. The plant is little cultivated in Central America, but in some regions small quantities of oil are produced. Pittier reports the Brunka name of Sii-krá.

SAPIUM Jacq.

Reference: Pittier, Contr. U. S. Nat. Herb. 12: 159. 1908.

Glabrous trees with milky latex; leaves petiolate, alternate, denticulate and often glandular on the margins, the petiole with 2 stipitate glands near the apex; flowers monoecious, apetalous, in terminal spikes; stamens 2 or 3; fruit capsular.—Other species occur in Central America. Some South American species of the genus yield a commercial rubber, but Central American trees seem not to have been exploited for that purpose. In Costa Rica the name Yos is given to all the species. In certain parts of Central America the trees have the reputation of being poisonous and on that account are

left when land is cleared. In other regions boys chew the coagulated latex to prepare birdlime for catching birds. It is possible that different species vary in their properties. The Costa Rican species are closely related and separated by details that are none too well marked.

Sapium jamaicense Swartz. *Yos. S. pleiostachys* Schum. & Pitt. Contr. U. S. Nat. Herb. 12: 164. *pl. 10.* 1908 (Golfito de Osa, *Pittier 9906*); *S. anadenum* Schum. & Pitt. loc. cit. *pl. 11* (Hacienda Valverde, Orosi, 1,200 meters, *Pittier 16366*). Common in forests of the tierra caliente, and in the lower part of the tierra templada. Central America and West Indies. A small tree, or sometimes as much as 25 meters in height; leaves oblong or elliptic; flower spikes clustered at the apex of the branch. In the other species the spikes are solitary. In Panama this species is called Olivo.

Sapium oligoneurum Schum. & Pitt. Contr. U. S. Nat. Herb. 12: 168. *pl. 17.* 1908. *Yos.* Near San Rafael, between Cartago and Cot, 1,500 meters, *Pittier 13403.* Common in forests of the central region, 1,200–1,700 meters, extending to the Pacific coast. Endemic. A tree of 6–12 meters, the crown broad or elongate, dense; leaves elliptic to oblong-obovate, the apex recurved.

Sapium pachystachys Schum. & Pitt. Contr. U. S. Nat. Herb. 12: 168. *pl. 16.* 1908. *Yos.* In pastures, El Copey, 1,800 meters, *Tonduz 11875.* Also in the region of La Palma de San José. Endemic. A tree of 6–9 meters; leaves elliptic, 8–12 cm. long, the apex scarcely recurved; spikes very thick and dense.

Sapium Pittieri Huber, Bull. Herb. Boiss. II. 6: 350. 1906. *S. pycnostachys* Schum. in sched. La Carpintera, 1,700 meters, *Pittier & Tonduz 4344.* Known only from the original collection. A tree of 6–8 meters; leaves broadly elliptic; glands arising at the base of the blade (at the apex of the petiole in the other species). Reported by Pax as *S. Laurocerasus* Desf.

Sapium sulciferum Pittier, Contr. U. S. Nat. Herb. 12: 169. *f. 10.* 1908. *Yos.* La Palma de San José, 1,550 meters, *Tonduz 12428.* Also in the vicinity of San José. Endemic. A tree of 9 meters, the bark smooth; leaves broadly elliptic or oblong-elliptic, 5–12 cm. long, the apex produced but not recurved.

Sapium thelocarpum Schum. & Pitt. Contr. U. S. Nat. Herb. 12: 166. *pl. 13.* 1908. *S. dolichostachys* Schum. in sched. Río Ciruelas, Volcán de Barba, 1,800 meters, *Tonduz 2219.* Common in the

Meseta Central, 1,100–1,800 meters; perhaps also in the Pacific coast; San Ramón. Endemic. A tree as much as 20 meters high; leaves lanceolate or oblong-lanceolate, 7–15 cm. long, the apex recurved.

Besides the species listed, I have collected in Dota and at Viento Fresco two plants that are probably new species. Unfortunately the specimens are sterile, and it is not advisable to describe the forms as new.

SEBASTIANIA Spreng.

Sebastiania sp. Between Liberia and Guachipelín, Guanacaste, *Brenes 15515*. The available material is scant and in poor condition, but apparently referable to this genus, or possibly to *Gymnanthes*.

Skutchia caudata Pax & Hoffm. in Morton, Journ. Wash. Acad. Sci. 27: 1937, is a synonym of *Trophis chorizantha* Standl. Field Mus. Bot. 4: 302. 1929 (Moraceae). This tree is not listed in the treatment of that family in the early part of the present volume. While there is some doubt as to the generic position of the species, there is none concerning its reference to the Moraceae.

SYNADENIUM Boiss.

Synadenium Grantii Hook. f. Cultivated for ornament in the region of San José. Native of East Africa. A shrub with thick branches; leaves alternate, somewhat fleshy, oblanceolate or obovate, obtuse or acutish, tapering to the base, entire or minutely dentate; flowers small, in lax, axillary cymes.

TETRORCHIDIUM Poepp. & Endl.

Another Central American species grows in Panama.

Tetrorchidium rotundatum Standl. Cerro de Aguacate, collected only by Oersted. Ranging to Honduras. A tree of 30 meters, the crown rounded; leaves alternate, oblanceolate-oblong, 8–15 cm. long, rounded at the apex, entire, glabrous; petiole elongate, with 2 glands near the apex; flowers small, green, in narrow panicles. Reported by Pax as *T. rubrivenium* Poepp. & Endl., a South American species. The wood is yellowish white.

TRAGIA L.

More or less scandent herbs; leaves alternate, long-petiolate, dentate or lobate, cordate at the base; flowers small, green, monoe-

cious, racemose; fruit a 3-celled capsule.—A few other species are known from Central America.

Tragia Bailloniana Muell. Arg. Forests of the Atlantic coast. Also in Honduras and southern Mexico. A large or small vine, provided with stinging hairs; leaves large, often deeply trilobate, 15–25 cm. long; racemes very long; capsule 1 cm. or more in breadth.

Tragia volubilis L. Common in thickets, Meseta Central to the Pacific coast. Widely distributed in tropical America. A small vine; leaves ovate or oblong, 3–6 cm. long, serrate.

VECONCIBEA Pax & Hoffm.

A single species occurs in Central America.

Veconcibea pleiostemona (Donn. Smith) Pax & Hoffm. Pflanzenreich IV. 147, vii: 218. 1914. *Conceveiba pleiostemona* Donn. Smith, Bot. Gaz. 54: 243. 1912. Río Blanco, Llanuras de Santa Clara, 300 meters, *Pittier 13425*. Known only from the original collection. A small tree; leaves alternate, petiolate, rounded or rounded-obovate, 13–18 cm. long, denticulate, somewhat tomentulose when young; flowers dioecious, apetalous, in terminal panicles.

CALLITRICHACEAE. Water Starwort Family

CALLITRICHE L.

Plants aquatic or growing in wet soil; leaves opposite, often approximate at the ends of the stems, entire, small; flowers minute, axillary, polygamous, often subtended by minute bracts, the calyx and corolla absent; stamen 1; ovary 4-celled; fruit coriaceous, indehiscent.—The family consists of a single genus, represented in Central America probably by only the following species.

Callitriche deflexa A. Br. La Hondura de San José, 1,300–1,700 meters, creeping on wet banks, *Standley 36203*. Also in Honduras; widely distributed in tropical America. Plants annual, prostrate, delicate, the stems seldom more than 5 cm. long; leaves obovate or obovate-lanceolate, rounded at the apex, 4–7 mm. long; fruits broader than long, short-pedunculate or subsessile.

CORIARIACEAE. Coriaria Family

The family consists of a single genus, represented in North America by one species.

CORIARIA L.

Represented in North America by one species.

Coriaria thymifolia Humb. & Bonpl. Known in Costa Rica only from the slopes of Irazú, 2,100–3,000 meters. Mexico to the South American Andes. A branched shrub 1–2 meters high; leaves opposite, almost sessile, distichous, lance-oblong or ovate, 1–2 cm. long, acute or obtuse, puberulent or glabrous, entire; flowers very small, dark purple, in long, slender racemes; sepals and petals 5; stamens 10; fruit of 5–18 laterally compressed carpels. The plant is poisonous and contains a toxic principle, coriarmirtine. It must be rare in Costa Rica, since I have never seen it in any of numerous excursions made to many parts of the country.

ANACARDIACEAE. Cashew Family

Trees or shrubs; leaves alternate, without stipules, simple or pinnate; flowers small, usually whitish, perfect, dioecious, or polygamous, paniculate; calyx of 3–7 lobes or segments; petals 3–7; stamens as many or twice as many as the petals; fruit superior, commonly drupaceous.—One or two other genera may occur in Central America.

ANACARDIUM L.

Trees or shrubs; leaves simple, entire, short-petiolate; flowers polygamous, in large, terminal panicles; calyx 5-parted; petals 5, linear; stamens 8–10; fruit large, nut-like, borne at the apex of a fleshy hypocarp that resembles a fruit.—Only two species occur in Central America.

Anacardium excelsum (Bert. & Balb.) Skeels. *Espavé, Espavel. A. rhinocarpus* DC. Common in forests of the tierra caliente, ascending to 800 meters. Ranging to the Guianas. A tree as much as 30 meters or more in height, almost glabrous; leaves obovate-oblong, 15–25 cm. long, rounded at the apex; panicles much longer than the leaves, with a brownish pubescence; stamens 10, 4 of them much longer than the others. The fruit is edible, like that of the following species, but the tree is not cultivated. The espavé is one of the largest of Central American trees, in some localities forming almost pure stands. The wood is pale brown or yellow, soft, and light in weight, rather fine-grained; it is hard to work, but is used for making trays and sometimes canoes, and for general construction. It is said that formerly the Indians of Talamanca used the bark for stupefying fish.

Anacardium occidentale L. *Marañón.* Common in the Pacific tierra caliente, sometimes forming small forests, also in the Atlantic coast, but there perhaps introduced; planted in many places in the temperate region. A species of wide distribution. A small tree, 10 meters or less in height; leaves oval-obovate, 10–14 cm. long; panicles about equaling the leaves, their pubescence gray; stamens 7 or 8, one much longer than the others. The hypocarp is one of the most popular fruits of Central America. During the fruiting season, in spring, almost every passenger on the trains returning from Puntarenas to the capital has one or more crates of the fruits. These in appearance resemble nothing so much as a bullnose pepper (*Capsicum annuum*), red or yellow in color, with a very distinctive flavor, which to me suggests black pepper. From it there is prepared a liquor that is employed in treating chronic dysentery. The nut contains an oil, cardol, which is acrid and caustic, producing blisters upon the skin. When thoroughly roasted, the seeds lose their caustic properties, and are then very good to eat. During the last few years they have been imported in large quantities into the United States, from India or other parts of the Old World, and are used here, as in Central America, in the preparations of confections, or are merely eaten roasted. A gum exuding from the trunk is employed like gum arabic. The wood is gray or brown, moderately hard and strong, but not very durable.

ASTRONIUM Jacq.

Astronium fraxinifolium Schott. Between Alajuela and Grecia, collected only by Brenes. Ranging from southern Mexico to South America. A large or medium-sized tree, similar in most respects to the following species, but the leaflets densely soft-pilose on the lower surface.

Astronium graveolens Jacq. Forests of the lower hills of Guanacaste, and probably in other parts of the tierra caliente, for it is abundant in many regions of the Atlantic coast of Central America. Extending to Brazil. A tall tree, the trunk with narrow buttresses; leaves pinnate, the numerous leaflets oblong or ovate, narrow-acuminate, petiolulate, dentate; flowers small, in large panicles; sepals accrescent in fruit and membranaceous, enclosing the small, dry fruit. Little is known of the occurence of this tree in Costa Rica, and I have seen it only at Líbano, but it is plentiful enough in other regions of Central America, where it is exploited for its wood. This is hard and heavy, red or reddish brown, often striped with black. It is durable, and in Central America is used for construc-

tion and cabinetwork. The tree is known in Panama as Zorro; in Salvador as Ronrón.

CAMPNOSPERMA Thwaites

The genus is chiefly East Indian, but one other species is known from America, in the Amazon Valley.

Campnosperma panamensis Standl. *Orey.* Changuinola Valley. Known from a few stations in the Atlantic lowlands of Panama. A large or medium-sized tree, with very thick branchlets, the young parts stellate-puberulent; leaves short-petiolate, oblong-obovate, mostly 25–30 cm. long, rounded and emarginate at the apex, cuneate at the base, stellate-lepidote beneath; panicles spike-like or somewhat branched, almost as long as the leaves; ovary lepidote.

MANGIFERA L. Mango

Mangifera indica L. *Mango.* A fruit tree imported from the East Indies (to Central America probably from the Philippines, by way of Panama or Acapulco, Mexico) in early colonial days; at present cultivated everywhere in Central America except in the higher regions, and the most popular fruit of the region; more or less naturalized in almost all inhabited parts. Pittier states that the mango was introduced into Costa Rica in 1796, which does not seem probable, since it must have been growing in Panama long before that date. Pittier writes: "It is certain that this handsome tree, so admirable for its generous production, is today well distributed through the tierra caliente and tierra templada, especially in Guanacaste, Nicoya, Puntarenas, and the valley of the Río Tárcoles. It is perhaps in Limón that one finds the greatest number of varieties, imported from Jamaica, the best known being the famous Number 11, but there the trees are fewer and the production less, since a wet climate is less favorable to the tree. The ripe fruit of the mango is a wholesome and agreeable fruit, in spite of a turpentine flavor that is more or less strongly marked, according to the variety. In Nicoya the fruit has become an important article of food in times of scarcity. From it there are prepared delicious jellies and confections. Unfortunately the tree reproduces with the greatest ease, springing up wherever seeds are cast, with the result that the fruit has greatly degenerated.

MAURIA Kunth

Small trees, almost glabrous; leaves pinnate, the leaflets petiolulate, entire; flowers small, whitish, pedicellate, in terminal and

axillary panicles; fruit a small, somewhat compressed drupe.—Another Central American species grows in Honduras.

Mauria Birringo Tulasne. *Cirrí amarillo.* Common in forests and thickets of the central region, 1,400–2,000 meters; region of San Ramón, at 1,000–1,200 meters. Extending to Peru. An almost glabrous tree of 4–8 meters; leaflets 3 or 5, elliptic-oblong, acute, obtuse or acute at the base, green; panicles sometimes densely pubescent.

Mauria glauca Donn. Smith, Bot. Gaz. 23: 5. 1897. *Cirrí amarillo.* Tres Ríos, *Pittier 88.* Common in forests of the central region, 1,100–1,800 meters; San Ramón. Also in Panama. Leaflets 5 or 7, oblong-lanceolate or narrowly oblong, acute or attenuate at the apex, acute at the base, pale; panicles glabrous or sparsely pubescent. It is questionable whether this form is a distinct species or not. The specimens seem different, but it is difficult to find characters by which it is always possible to separate the two forms. Pittier reports the Bribrí name of Koró.

MOSQUITOXYLUM Krug & Urban

The genus consists of a single species.

Mosquitoxylum jamaicense Krug & Urban. *Cirrí, Cirrí blanco, Cirrí colorado.* Region of San Ramón, at 1,000 meters, collected only by Brenes. Southern Mexico to Panama; Jamaica. A large tree, or sometimes only a shrub, in Costa Rica said to be 3–6 meters high; leaves pinnate, the leaflets 11–17, obovate to oblong, rounded or obtuse at the apex, unequal at the base, coriaceous, minutely pilose beneath or almost glabrous; flowers small, greenish, in large, axillary panicles; fruits drupaceous, red, somewhat compressed, 8 mm. long. Called mosquito wood in Jamaica, hence the generic name. The wood is pale reddish brown tinged with yellow, hard, heavy, strong, rather fine-textured, somewhat cross-grained, and moderately durable.

RHUS L.

Shrubs or small trees; leaves pinnate, the leaflets coriaceous, entire or nearly so in the Costa Rican species; flowers polygamous, in axillary and terminal panicles; fruit drupaceous, small.—No other species are known from southern Central America.

Rhus striata Ruiz & Pavón. *Hinchador. R. juglandifolia* Willd. Common in thickets south of Cartago; region of San Ramón, and probably elsewhere. Mexico to Peru. A shrub or small tree; leaflets

11–15, oblong, 7–15 cm. long, glabrous or somewhat pubescent; acuminate, entire; panicles 15–30 cm. long, the flowers white, small, drupe 8 mm. long, glabrous. A well known shrub in the regions where it grows, because of its poisonous properties. The sap in contact with the skin causes blisters and often severe swelling, at least in some persons. In various other parts of the world there are other species of *Rhus* with the same properties.

Rhus costaricensis Riley, Kew Bull. 184. 1922. Río Virilla, Prov. San José, 1,100 meters, *Tonduz 6999*. Thickets of the central region, 1,100–1,400 meters, but rather rare. Ranging to southern Mexico. A shrub of 1.5–2.5 meters; leaflets 3–15, densely soft-pubescent beneath, 2–6 cm. long; drupes red, pilose.

ŚCHINUS L.

Schinus Molle L. *Pepper tree.* Sometimes planted about San José as a shade or ornamental tree. Native of Peru. A small or medium-sized tree with spreading crown and often somewhat pendent branches; leaves pinnate, with numerous small, narrow, more or less dentate leaflets; flowers small, whitish, in large panicles; fruits small, red, very showy.

SPONDIAS L.

Trees or shrubs; leaves pinnate, the leaflets numerous, entire, unequal at the base; flowers small, polygamous; stamens 8 or 10; fruit a large drupe, usually 1–3-celled.—It is probable that no other species exist in Central America.

Spondias Mombin L. *Jobo. S. lutea* L. Frequent in forests of the tierra caliente; San Ramón. Common in hedges, and also planted. A species of wide distribution. A medium-sized tree, usually glabrous, the bark smooth and pale, the sap with an aromatic odor; leaflets acuminate; flowers whitish, in large, glabrous, terminal panicles; fruit yellow, large. The fruit is acidulous and refreshing, but it is eaten less than that of *S. purpurea*. The wood is white and soft, and used only for fuel. The tree often is planted for living fence posts. Among Indian names the following are reported: Bra, Braá, Bará (Cabécara); Bra (Bribrí); Bra-kra (Brunka); Frap (Térraba); Mube (Carib); Balá (Bri-brí); Paran, Páalan (Guatuso).

Spondias nigrescens Pittier, Contr. U. S. Nat. Herb. 18: 75. *f. 82.* 1914. Forests of Nicoya, *Tonduz 13925*. Forests of the Atlantic coast. Also in Panama. A tree with rounded crown; leaflets 5–17, pubescent; drupes pubescent when young.

Spondias purpurea L. *Ciruelo, Jocote.* Common in hedges of the Meseta Central, where it is multiplied by means of large branches cut and placed in the ground; extending to the Pacific coast, and abundant in many localities. Widely distributed in tropical America. A shrub or small tree, the branches few and thick; leaflets small, obtuse, usually glabrous; flowers red or purple, in small panicles arising from old branches. The red or purple, sometimes yellow fruits have a pleasant, acid flavor. In appearance as well as flavor they resemble plums of the temperate regions (*Prunus* spp.). The jocote is one of the trees most often used for living fence posts. The leaves have a rather agreeable, acid flavor.

TAPIRIRA Aubl.

One or two additional species are known from Panama.

Tapirira Brenesii Standl., sp. nov.—Arbor 8–12-metralis, ramulis crassis fusco-ferrugineis subangulatis vel subteretibus plus minusve interdum dense fulvo-strigosis, versus apices dense foliatis; folia longe petiolata, petiolo cum rhachi usque 18 cm. longo gracili subtereti sparse fulvo-strigilloso vel fere glabro; foliola 5–9 atque 4–7 mm. longe petiolulata coriacea anguste lanceolato-oblonga vel oblonga 6–13 cm. longa 2–4 cm. lata longe anguste obtuso-acuminata, basi obliqua acuta, utrinque lucida, glabra vel subtus ad costam paullo pilosula, in sicco fusca vel subferruginea, costa nervisque supra prominentibus vel prominulis, costa subtus gracili elevata, nervis lateralibus numerosis prominentibus, venulis prominulis laxe reticulatis; paniculae axillares spiciformes vel thyrsiformes 8–11 cm. longae longipedunculatae, ramis vix ultra 1.5 cm. longis patentibus fulvo-hirtellis, bracteis ovatis acutis hirtellis floribus brevioribus, floribus aggregatis sessilibus; calyx paullo ultra 1 mm. longus glabratus, lobis rotundato-ovatis; petala alba anguste oblonga usque 3.5 mm. longa extus sicut intus glabra, staminibus duplo longiora; drupa ovalis circiter 2.5 cm. longa et 1.5 cm. lata glabra basi et apice late rotundata.—In pasture, Colinas de Piedades near San Ramón, 750–1,000 meters, *Brenes 5460* (type in Herb. Field Mus.); Colinas de San Pedro de San Ramón, 1,025 meters, *Brenes 5016, 5444, 17533.*

AQUIFOLIACEAE. Holly Family

Most of the representatives of this family belong to the following genus, the only one found in Central America.

ILEX L. Holly

Reference: Standley, The Costa Rican species of *Ilex*, Journ. Wash. Acad. Sci. 16: 481. 1926.

Shrubs or small trees; stipules minute; leaves alternate, entire or dentate; flowers small, whitish, perfect or polygamous, solitary or in cymes; calyx with 4 or 5 sepals or teeth; petals 4–7, obtuse; stamens as many as the petals, united with the base of the corolla; fruit a drupe containing 4–8 hard nutlets; stigma discoid, sessile.—A few other species grow in northern Central America.

Ilex Brenesii Standl., sp. nov.—Frutex vel arbuscula omnino glabra, ramulis gracilibus striatis fuscis, vetustioribus lenticellis magnis elevatis onustis, sat dense foliatis; folia longipetiolata tenuiter coriacea mediocria, petiolo gracili supra canaliculato usque 2.5 cm. longo; lamina anguste oblongo-lanceolata vel lanceolato-oblonga 6–8 cm. longa 1.5–2.3 cm. lata longe angustissime attenuato-acuminata basi acuta vel subobtusa integra, supra in sicco lucida fusca, costa anguste impressa, nervis subimpressis inconspicuis, subtus fusco-brunnescens sublucida densissime minute pallido-punctata, costa gracili elevata, nervis lateralibus utroque latere ca. 11 adscendentibus prominulis inconspicuis arcuatis ante marginem arcuato-conjunctis; inflorescentiae masculae axillares cymosae repetite ramosae pedunculo incluso usque 9 cm. longae laxae, ramis gracillimis angulatis, bracteis lanceolato-subulatis ca. 1.5 mm. longis, pedicellis gracilibus plerumque fere 1 cm. longis; calyx ca. 1.5 mm. longus, lobis 4 ovato-rotundatis apice rotundatis vel acutiusculis; petala 4 ovalia 2 mm. longa.—La Palma y El Socorro de San Ramón, July, 1928, *Brenes 6226* (Herb. Field Mus., type). The relationship of this species is clearly with *I. Valerii*. From that it differs in the conspicuously narrow and narrowly long-acuminate leaves, as well as in the amply branched, greatly elongate, and lax inflorescences.

Ilex carpinterae Standl. Journ. Wash. Acad. Sci. 15: 477. 1925. Forests of Cerro de La Carpintera, 1,800 meters, *Standley 34491*. Wet forests of the central region, 1,400–2,000 meters; region of San Ramón, 1,100 meters. Endemic. A tree of 6 meters, sometimes epiphytic, the crown dense and rounded, glabrous; leaves short-petiolate, oblong or elliptic-oblong, 3.5–6 cm. long; acute, crenulate-serrate. Closely related to *I. lamprophylla*, and perhaps not distinct.

Ilex costaricensis Donn. Smith, Bot. Gaz. 57: 416. 1914. Cuesta de La Cara, near El Páramo, Prov. Puntarenas, *Pittier 10843*.

Known only from the original collection. Glabrous; leaves elliptic, 4.5–6.5 cm. long, acuminate, the petiole 1.5–2 cm. long; peduncles 1–3-flowered. I have not seen the type of this species and do not know whether it is one of the species that I have published, but if the description is correct, it is different.

Ilex lamprophylla Standl. Journ. Wash. Acad. Sci. 15: 476. 1925. La Estrella, Prov. Cartago, *Standley 39440*. Common in forests of the central region, 1,400–2,000 meters. Endemic. A shrub or tree of 2.5–9 meters, glabrous; leaves elliptic, short-petiolate, acute, crenate-serrate; flowers greenish white. Although abundant in many localities, this tree is not at all conspicuous, as is the case also with the other species, which have no outstanding characters. Nevertheless, it is strange that such common plants should have been overlooked by early collectors, almost all the specimens having been collected by the writer.

Ilex pallida Standl. Journ. Wash. Acad. Sci. 16: 482. 1926. Cerros de Zurquí, northeast of San Isidro de Heredia, 2,300 meters, *Standley & Valerio 50608*. Also in forests of Dota, ascending to 3,000 meters. Endemic. A shrub of 1.5–3 meters, the branchlets densely puberulent; leaves short-petiolate, elliptic, 4–9 cm. long, acuminate, somewhat serrulate; peduncles 2–3-flowered.

Ilex ramonensis Standl., sp. nov.—Frutex vel arbuscula omnino glabra, ramulis crassiusculis fuscis striatis teretibus vel subangulatis sat dense foliatis; folia breviuscule petiolata coriacea, petiolo crassiusculo 8–12 mm. longo; lamina elliptica, oblongo-elliptica vel rarius ovato-elliptica 7–9 cm. longa 3–4.5 cm. lata vel major subabrupte anguste acuminata vel longiacuminata, basi subobtusa vel rotundata et abrupte acute contracta, integra, in sicco fusca, supra lucida costa anguste impressa, nervis inconspicuis subimpressis, subtus opaca densissime minute puncticulata, costa gracili elevata, nervis lateralibus utroque latere circiter 6 angulo latiusculo adscendentibus prominulis irregularibus ante marginem arcuato-junctis, venulis prominulis laxe reticulatis; inflorescentiae feminae axillares vel extra-axillares umbelliformes 3–8-florae, pedunculo 5–8 mm. longo, pedicellis aequilongis vel brevioribus gracilibus; calyx vix ultra 1 mm. longus, lobis 4 late ovatis acutiusculis; petala ovalia 2.5 mm. longa.—Entre Pata de Gallo y Santiago de San Ramón, February, 1929, *Brenes 6639* (type in Herb. Field Mus.). A relative of *I. Valerii*, which differs conspicuously in its elongate petioles.

Ilex tristis Standl. Journ. Wash. Acad. Sci. 16: 482. 1926. Forests of Cerro de Las Vueltas, 3,000 meters, *Standley & Valerio 43670*. Known only from Cantón de Dota, 2,100–3,000 meters. A shrub or tree of 3–12 meters, almost glabrous; leaves short-petiolate, rounded at the apex, not punctate, crenate.

Ilex Valerii Standl. Journ. Wash. Acad. Sci. 16: 483. 1926. Cerros de Zurquí, northeast of San Isidro de Heredia, 2,300 meters, *Standley & Valerio 50582*. One collection from the vicinity of San José perhaps represents the same endemic species; region of San Ramón, 1,100 meters. A tree of 4.5–9 meters, glabrous; leaves elliptic or elliptic-oblong, acute, entire; peduncles 3–6-flowered.

Ilex vulcanicola Standl. Journ. Wash. Acad. Sci. 15: 477. 1925. Las Nubes, Prov. San José, *Standley 38729*. Common in wet forests of the slopes of the central volcanoes, 2,000–2,700 meters. Endemic. Branchlets pubescent; leaves elliptic to rounded, 1.5–3 cm. long, rounded at the apex, punctate beneath; pedicels fasciculate in the leaf axils.

CELASTRACEAE. Bittersweet Family

Trees or shrubs, the leaves simple, entire or dentate, opposite or alternate; stipules none, or small and caducous; flowers small, regular, generally perfect, the pedicels mostly articulate; calyx with 4 or 5 lobes or sepals, persistent; petals 4 or 5; stamens inserted on a disk; ovary 3–5-celled, the style short; fruit drupaceous or capsular.—A few other genera are represented in Central America, and probably also in Costa Rica.

EUONYMUS L.

No other species are known from Central America.

Euonymus costaricensis Standl., sp. nov.—Arbuscula 3–5-metralis, interdum subscandens, omnino glabra; folia breviter petiolata firme membranacea opposita, petiolo 4–6 mm. longo; lamina lanceolato-oblonga vel elliptico-oblonga 7–12 cm. longa 2–4.5 cm. lata breviter obtuse acuminata vel sensim acuminata, basi subacuta, arcte crenato-serrulata, subtus paullo pallidior, nervis remotis tenerrimis inconspicuis; flores pauci cymosi virides, cymis axillaribus breviter vel longiuscule pedunculatis 2–5-floris, pedicellis gracilibus usque ad 5 mm. longis; calyx 2.5 mm. latus, lobis late rotundatis; petala rotundata vix 2 mm. longa; pedicelli fructiferi elongati usque ad 1.5 cm. longi; capsula subglobosa laevis 1 cm. diam. intense rubra, statu juvenili obtuse tuberculata.—Wet forest,

Fraijanes, Prov. Alajuela, 1,500–1,700 meters, *Standley & Torres 47503* (type in U. S. Nat. Herb.), *47524;* near Quebradillas, north of Santa María de Dota, 1,800 meters, *Standley 42921;* Cerro de La Carpintera, *Standley 35546.* A slender shrub, sometimes, apparently, scandent; capsules dark red, the aril surrounding the seed bright orange. An isolated species, other members of the genus occurring in Mexico and the United States, as well as in the Old World.

GYMINDA Sarg.

Probably there are no other known species in Central America.

Gyminda costaricensis Standl., sp. nov.—Frutex 1–2-metralis omnino glaber, ramis gracilibus brunneis rimosis; folia opposita breviter petiolata subcoriacea pallida, petiolo 1–2 mm. longo; lamina oblonga vel lanceolato-oblonga 3–7.5 cm. longa 1.5–2.5 cm. lata obtusa vel apicem obtusum versus angustata, basi obtusa vel acutiuscula, crenato-serrulata, nervis utrinque tenerrimis sed manifestis; flores cymosi, cymis breviter pedunculatis solitariis vel fasciculatis plerisque trifloris, pedicellis brevissimis vel nullis; sepala rotundata ca. 0.6 mm. longa minute ciliolata; petala alboviridula late ovalia apice rotundata persistentia 2 mm. longa.—Thickets along the Río Reventado, north of Cartago, 1,500 meters, *Standley & Valerio 49568* (type in Herb. Field Mus.); forests near Santa María de Dota, 1,500–1,800 meters, *Standley 42378*; Colinas de San Pedro de San Ramón, *Brenes 20475;* La Palma de San Ramón, *Brenes 6372.* The fruit in this genus is drupaceous. It is probable that this species is the one reported from the region of Cartago with the name *Myginda latifolia* Swartz, a plant of Mexico and the West Indies.

MAYTENUS Molina

A few other species occur in Central America.

Maytenus trichotomus Turcz. Forests of Cerro de Las Caricias, Prov. Heredia, 2,000–2,400 meters. Extending to Mexico. A shrub or tree of 3–6 meters, glabrous; leaves alternate, petiolate, oblong-elliptic, 4–10 cm. long, acuminate, coriaceous, crenate; flowers greenish white, in short panicles, pedicellate; fruit capsular, subglobose, dehiscent by 3 valves, 1 cm. long, with a single seed surrounded by an orange aril. It may be that the Costa Rican plant is a distinct species, but the differences, if any, do not seem to be important.

MICROTROPIS Wall.

Another Central American species is found in Guatemala.

Microtropis occidentalis Loes. Forests of the mountains of the whole central region, 1,500–2,400 meters. Ranging to Mexico. A shrub or tree of 6 meters or less, sometimes epiphytic and somewhat scandent, glabrous; leaves short-petiolate, opposite, oblong to elliptic, acute or short-acuminate, somewhat coriaceous, 6–13 cm. long, entire; flowers greenish or whitish, 3 mm. broad, in small cymes, the petals persistent; fruit an oblong capsule 12 mm. long, 1-seeded.

PERROTETIA HBK.

Shrubs or small trees; leaves alternate, short-petiolate, almost membranaceous, serrate; flowers minute, polygamo-dioecious, in axillary panicles or racemes; calyx 5-lobate; petals 5; stamens 5; fruit a small, 2-celled berry containing 2–4 seeds.—No other species are reported from Central America.

Perrotetia longistylis Rose. Forests of La Hondura, Prov. San José, 1,300–1,700 meters. Extending to Mexico. An almost glabrous shrub of 2.5–4.5 meters; leaves oblong-ovate, 7–15 cm. long, narrowly acuminate, obtuse or rounded at the base, serrate; flowers greenish, in slender, many-flowered panicles, the branches pubescent; capsule depressed, 2–3 mm. broad. This species probably is not different from the Colombian *P. lanceolata* Karst.

Perrotetia racemosa Standl., sp. nov.—Frutex praeter inflorescentiam fere omnino glaber, ramulis gracilibus brunnescentibus; folia crasse papyracea petiolata, petiolo gracili 8–12 mm. longo; lamina lanceolato-oblonga 7–12 cm. longa 2.5–3.5 cm. lata longe anguste attenuato-acuminata, basi acuta, glabra, arcte crenato-serrata, nervis lateralibus utroque latere ca. 4 valde adscendentibus; flores racemosi, racemis in axillis fasciculatis multifloris hirtellis foliis duplo brevioribus, pedicellis gracilibus 3 mm. longis; sepala recurva obtusa; capsula subglobosa 3 mm. diam.—Wet forest, Yerba Buena, northeast of San Isidro de Heredia, 2,000 meters, *Standley & Valerio 49894*. Similar to the preceding species, but differing in the narrower leaves, acute at the base, and with ascending lateral nerves, also in the racemose, not paniculate flowers.

SCHAEFFERIA Jacq.

A single species is known from Central America. The few others are native in tropical America.

Schaefferia frutescens Jacq. Isla de Chira, Golfo de Nicoya, *Manuel Valerio 1476*. Extending to Colombia, West Indies, Mexico, and Florida. A glabrous shrub or small tree; leaves alternate, entire, coriaceous, short-petiolate, lanceolate or elliptic, acute or acuminate; flowers pedicellate and fasciculate in the leaf axils, dioecious, 4-parted; petals 3.5–4 mm. long; fruit an almost dry, 2-celled, bright red drupe 4–6 mm. long. The wood is yellow and dense.

ZINOWIEWIA Turcz.

The genus contains a single species.

Zinowiewia integerrima Turcz. Cerros de Candelaria, and probably elsewhere. Also in Panama and Mexico. A small, glabrous tree; leaves opposite, elliptic or ovate, petiolate, acute or acuminate, entire; flowers very small, in small, axillary cymes; petals and stamens 5; fruit a 1-seeded samara 2 cm. long, the wing terminal and decurrent, obtuse. Easy of recognition because of the small, winged fruits.

HIPPOCRATEACEAE. Hippocratea Family

Trees, shrubs, or woody vines; leaves generally opposite, with stipules, petiolate, entire or dentate; flowers small, white or greenish, sometimes yellowish, perfect, regular, in cymes; calyx 5-parted, the sepals imbricate, persistent; petals 5; disk depressed or cupular; stamens 3, inserted near the base of the disk, the filaments compressed; ovary 3-celled, with 2–10 ovules in each cell; fruit a berry or a 3-lobate capsule.—The family consists of only two genera.

HIPPOCRATEA L.

Woody vines, small or climbing to the tops of tall trees; fruit composed of 3 carpels that are almost distinct, flattened, rounded at the apex, and vertically compressed.—Other species grow in Central America. The genus may be recognized readily by the small flowers with 3 short stamens, and especially by the fruit, altogether unlike that of any other group of plants. It is certain that other species will be found in Costa Rica, the available collections being few, and there are other common species that would be expected.

Hippocratea malpighiaefolia Rudge. Thickets of the Pacific coast. Extending to the Guianas. Leaves elliptic or oblong-elliptic, 10–14 cm. long, acute, subcoriaceous, pale when dried, entire or nearly so; carpels 8–10 cm. wide. It is not certain that the Costa

Rican collections belong to this species, but until a monograph of the genus has been published, it will be impossible to make exact determinations in the family.

Hippocratea obovata Pittier, Contr. U. S. Nat. Herb. 12: 176. *f. 13*. 1909. Nicoya, *Tonduz 13891*. Forests and thickets of the Pacific tierra caliente. Endemic. A small tree(?); leaves short-petiolate, obovate or obovate-oblong, 5–10 cm. long, obtuse or rounded at the apex, glabrous; inflorescence pubescent. The type collection has been referred to *H. uniflora* Moc. & Sessé and *H. setulifera* (Miers) Hemsl.

SALACIA L.

Other species are known from Central America.

Salacia praecelsa (Miers) Standl. Forests near Santa María de Dota, 1,500–1,800 meters; reported from El General. Also in Panama. A large, woody vine; leaves coriaceous, elliptic, entire, acuminate, petiolate; fruits large, globose, the seeds not winged. The determination of the Costa Rican collection is not at all certain, the species of the genus being greatly confused.

STAPHYLEACEAE. Bladdernut Family

Represented in Central America only by the following genus.

TURPINIA Vent.

Glabrous shrubs or trees; leaves opposite, pinnate, the leaflets opposite, dentate; flowers small, white, perfect, in terminal panicles; calyx 5-lobate, persistent; petals 5, rounded, sessile, imbricate; disk lobulate or crenate; stamens 5; ovary trilobate, sessile; styles 3; fruit a globose capsule, 3-celled, fleshy, indehiscent.—No other species are known to inhabit Central America.

Turpinia occidentalis (Swartz) Don. Santa Bárbara; region of San Ramón. Ranging to Mexico and West Indies. A tree of 9 meters, in general appearance similar to *Sambucus;* flowers 4–5 mm. long.

Turpinia paniculata Vent. Forests of the central region, at about 1,800 meters. Ranging to Mexico and West Indies. A tree about 9 meters high; flowers only 2–2.5 mm. long.

ICACINACEAE. Icacina Family

Shrubs or trees; leaves generally alternate and entire, without stipules; flowers small, perfect or unisexual; calyx inferior, 4–5-

lobate, the segments imbricate; petals 4 or 5, sometimes united near the base; stamens 4 or 5, alternate with the petals; ovary usually 1-celled; fruit drupaceous, 1-celled, 1-seeded.—Other genera represented in Central America (Panama) are *Mappia* and *Discophora*. The family has only a few American representatives, which are rather difficult to recognize because the plants have no outstanding characters to mark them.

CALATOLA Standl.

The genus contains two other species, in Mexico and northern Central America.

Calatola costaricensis Standl. Journ. Wash. Acad. Sci. 16: 416. 1926. *Duraznillo, Palo de papa, Palo azul, Erepe.* Forests of Yerba Buena, northeast of San Isidro de Heredia, 2,000 meters, *Standley & Valerio 50000.* Frequent in mountain forests of the central region, 1,500–2,000 meters. Also in Panama. A tree of 6–15 meters or more, the crown dense, broad or sometimes narrow; leaves petiolate, oblong, 10–25 cm. long, blackish when dried, short-acuminate or obtuse, entire; flowers minute, green, dioecious, the staminate spikes elongate and axillary, ament-like, the pistillate flowers solitary and axillary or in short spikes; fruit oval, 5–7 cm. long; nut globose, 4.5–6.5 cm. long, cristate. An interesting tree, easy to recognize by its fruits, especially the nuts, which have somewhat the appearance of English walnuts (nogales de Castilla). The seeds are white, with a consistency and flavor suggestive of coconut. The people of the volcanoes of Poás and Barba roast and eat the seeds, and also grind them into a coarse meal with which they prepare a kind of tortilla. Notwithstanding the abundance of the tree in some localities—it grows also in Santa María—it seems to be little known. It is reported to yield good wood that is employed for construction. The name palo azul refers probably to a bluish cast that often characterizes the fresh leaves.

VILLARESIA Ruiz & Pavón

No other species is known from North America.

Villaresia costaricensis Donn. Smith, Bot. Gaz. 31: 110. 1901. Forests near El Copey, 1,800 meters, *Tonduz 11664.* Occasional in forests of the central region, 1,500–1,800 meters. Endemic. A weak shrub of 3–5 meters, glabrous; leaves oblong-elliptic, 9–17 cm. long, acuminate, entire; flowers small, greenish white, in axillary and terminal racemes; sepals pubescent; petals 2.5 mm. long; drupe black, oval, 2.5 cm. long.

HIPPOCASTANACEAE. Horse Chestnut Family

A single genus occurs in Central America.

BILLIA Peyr.

One other species of the genus is known, in Mexico.

Billia colombiana Planch. & Lind. *Cocora, Cucaracho.* Common in forests of the temperate region and in the upper part of the Atlantic tierra caliente, 700–2,400 meters. Guatemala to Venezuela. A tree of 7–20 meters, glabrous, the crown dense and rounded; leaves opposite, without stipules, digitate, long-petiolate, the 3 leaflets petiolulate, elliptic, acuminate, entire; flowers large, red, in small, terminal panicles; calyx 5-lobate; petals 1.5–2 cm. long; fruit a coriaceous, 3-celled capsule, with a single seed in each cell. An exceptionally attractive tree because of its abundance of brilliant red flowers. It is often a conspicuous object in the pastures of the central mountains.

SAPINDACEAE. Soapberry Family

Reference: Radlkofer, Pflanzenreich IV. 165. 1931–34.

Trees or shrubs, rarely scandent herbs, often woody vines; leaves generally alternate, without stipules, mostly compound, rarely simple; flowers small, polygamo-dioecious, regular or nearly so; calyx of 4 or 5 lobes or sepals; petals 3–5; disk fleshy; stamens 5–10; ovary 1, entire or lobate, 2–4-celled; fruit very variable.—A few other genera have representatives in Central America.

ALLOPHYLUS L.

Small trees or shrubs; leaflets 3; flowers small, white, in axillary, simple or paniculate racemes; sepals 4; petals 4; fruit drupaceous, small, dry or fleshy.—Other species occur in northern Central America.

Allophylus occidentalis (Swartz) Radlk. *Esquitillo.* Thickets and open forest of the Pacific tierra caliente; reported also for the region of Cartago. Mexico to West Indies and Venezuela. A shrub or tree of 2–6 meters; leaflets elliptic to lanceolate, acuminate, dentate or almost entire, soft-pubescent beneath.

Allophylus panamensis Radlk. Region of Dota; San Ramón. Also in Panama. A tree of 8 meters; leaflets obovate or lanceolate, dentate or almost entire, obtuse to acuminate, almost glabrous; drupes 6–8 mm. long.

Allophylus psilospermus Radlk. *Huesillo.* Forests of the tierra caliente; region of San Ramón. Guatemala to Panama and Martinique. A shrub or small tree, similar to the preceding species, but the flowers larger, and the drupes 1–1.5 cm. long.

BLIGHIA Koenig

Blighia sapida Koenig. *Seso vegetal, Aki.* Planted commonly in the Atlantic coast, especially by the Jamaicans. Imported from Africa, perhaps by slaves. A handsome tree with pinnate leaves; fruit a large capsule containing large, black seeds. The white, juicy aril surrounding the seeds is edible when cooked, but highly poisonous when raw. It is usually prepared for eating by frying.

CARDIOSPERMUM L. Balloon vine

Two other species are known from Central America.

Cardiospermum grandiflorum Swartz. *Chimbolillo.* Common in thickets of the tierra caliente; San Ramón. A species of wide distribution. A large vine, herbaceous or somewhat woody, pilose; leaves twice ternate, the leaflets lobate and dentate; flowers white, 5–6 mm. long, corymbose; capsule inflated, 5–7 cm. long, containing 3 dark, shot-like seeds having a white, cordate hilum. Easy of recognition because of the peculiar large, membranaceous, and inflated capsules.

CUPANIA L.

Trees or shrubs; leaves pinnate, sometimes very large, the leaflets alternate; flowers small, white, in large, terminal panicles or in paniculate racemes; sepals 4 or 5; petals 5; stamens 8; fruit a trilobate or 3-angulate capsule, with 1 seed in each cell.—Other species grow in Central America. Very young plants of species with numerous leaflets often have simple leaves.

Cupania cinerea Poepp. & Endl. Forests of the Atlantic coast. Ranging to Bolivia. A shrub or small tree; leaflets 6–10, large, rounded at the apex, pale and tomentulose beneath. Well marked by the pale tomentum of the lower leaf surface. Known in Panama by the names Gorgojo and Gorgojero.

Cupania costaricensis Radlk. Repert. Sp. Nov. 17: 364. 1921. Guácimo, Atlantic slope, 140 meters, *Tonduz 14879.* Known only from the original collection. Leaflets 6–8, oblong, subtruncate at the apex, tomentulose beneath, coarsely dentate; ovary densely tomentose.

Cupania glabra Swartz. *Cascuá.* Thickets and forests of the central mountains, 1,200–1,700 meters; region of San Ramón. Extending to Mexico and West Indies. A tree of 6–12 meters with gray bark; leaflets 6–14, rounded at the apex, remotely dentate or almost entire, glabrous or somewhat pubescent; capsule 1.5–2 cm. long, glabrous.

Cupania guatemalensis Radlk. *Cantarillo, Carne asada, Huesillo, Pozolillo, Manteco.* Common in thickets of the Pacific slope, ascending to 1,500 meters. Mexico to Panama. A shrub or small tree of 3–10 meters; leaflets 6–10, oblong-lanceolate, obtuse or acute, densely soft-pubescent beneath, often entire; capsule pubescent.

Cupania largifolia Radlk. Bull. Herb. Boiss. II. 5: 327. 1905. Alto del Pito, Cantón de Dota, 1,100 meters, *Tonduz 7702.* Region of San Ramón. Endemic. A tree of 5–7 meters; leaflets about 5, elongate-elliptic, 18–32 cm. long, obtuse, almost entire, puberulent on the nerves; ovary tomentose.

Cupania macrophylla A. Rich. Cerro de Las Caricias, Prov. Heredia, 2,000–2,400 meters. Extending to Mexico and West Indies. A tree of 6 meters; leaflets usually 2 or 4, obovate or oblong, rounded at the apex, entire, almost glabrous, foveolate beneath in the axils of the nerves; capsule glabrous.

Cupania macropoda Standl., sp. nov.—Ramuli ochracei vel brunnescentes teretes glabri vel minute strigillosi sat dense foliati; folia inter minora breviter petiolata, foliolis 2–4 atque 5–10 mm. longe petiolulatis oblanceolato-oblongis 6–12 cm. longis 2.5–5 cm. latis apice obtusissimis vel rotundatis basin versus cuneatim longi-attenuatis integris tenuiter coriaceis in sicco subfuscis sublucidis, costa venisque supra vix prominulis, costa subtus elevata gracili, nervis lateralibus utroque latere ca. 8 angulo semirecto vel paullo latiore adscendentibus arcuatis, venulis vix prominulis arcte reticulatis; paniculae subterminales parvae dense multiflorae breviter pedunculatae thyrsiformes vix ultra 6 cm. longae, ramis sparse minute puberulis, pedicellis usque 1 cm. longis; calyx 2.5 mm. latus patens puberulus; ovarium longe stipitatum sparse puberulum; capsula crasse 8 mm. longe stipitata glabra subprofunde triloba, immatura fere 2 cm. longa et 1.5 cm. lata, angulis acutiusculis.—San Pedro de San Ramón, lado de San Francisco, February, 1929, *Brenes 6613* (type in Herb. Field Mus.).

DIPTERODENDRON Radlk.

Trees; leaves twice pinnate, the numerous leaflets small, oblong or lanceolate, serrate; flowers small, white, in large panicles; stamens 8; fruit a capsule about 2 cm. in diameter, red, 2–3-celled, dehiscent. —The genus consists of only the species listed here.

Dipterodendron costaricense Radlk. Smiths. Misc. Coll. 61, No. 24: 7. 1914. *Iguano, Loro.* La Balsa de Río Grande, *Pittier 3645.* Common in forests of the Pacific tierra caliente. Also in Panama. A tree of 15–20 meters; leaflets glabrous. Called Harino or Jarino in Panama. The wood is brownish or pink, heavy and rather hard, of irregular grain but not difficult to work.

Dipterodendron elegans Radlk. loc. cit. *Gallinazo. Dilodendron bipinnatum* Radlk. var. *elegans* Radlk. in Mart. Fl. Bras. 13, pt. 3: 597. 1900. Near Turrialba, *Oersted 4.* Collected also at San Ramón and El Rodeo, ascending to 1,400 meters. Endemic. A tree of 5–20 meters; leaflets minutely papillose and strigillose beneath. I suspect that this is only a form of the preceding species.

DODONAEA L.

In North America there is a single species.

Dodonaea viscosa (L.) Jacq. Frequent in thickets and open forest of the central region, especially in Cantón de Dota; also on the Atlantic beaches. Almost pantropic in distribution. A shrub or tree of 2–6 meters, glabrous but viscid; leaves simple, oblong-oblanceolate, acute or obtuse, entire, short-petiolate; flowers yellowish, in small, lateral corymbs; petals none; fruit a 3-winged capsule 1.5–2.5 cm. wide. It is strange that this plant should grow in two regions so different as the oak forests of Dota and the Atlantic beaches, and not in the intervening regions, but I find no differences in specimens from the two regions. The wood is said to be brown, fine-grained, and hard.

MATAYBA Aubl.

Additional species occur in Central America.

Matayba livida Radlk. Repert. Sp. Nov. 17: 365. 1921. Cerros de Zent, Atlantic coast, *Tonduz 14876.* Known only from the type collection. A tree; leaves pinnate, the 5–7 leaflets alternate, oblong-lanceolate, as much as 14 cm. long, acuminate, entire, almost glabrous; flowers in axillary, pubescent panicles; capsule 2-celled, 1.5 cm. long, almost sessile.

Matayba oppositifolia (A. Rich.) Britton. Colinas de San Pedro de San Ramón, *Brenes 5833a.* Ranging to Honduras, and in Cuba and Puerto Rico. A tree 7–12 meters high, the trunk 7–20 cm. in diameter; leaves mostly opposite, the leaflets more numerous, oblong to obovate or oblanceolate, obtuse to acuminate, glabrous, entire; flowers small, greenish, in large panicles; capsule 2–3-lobate, stipitate, 1 cm. long.

MELICOCCA L.

Melicocca bijuga L. *Mamón, Mamón de Cartagena.* Sometimes planted at Puntarenas and elsewhere, rare in Costa Rica. Native of northern South America. A medium-sized tree; leaves even-pinnate, the 4 leaflets elliptic-oblong, entire, glabrous, the petiole winged; flowers small, whitish, fragrant, in terminal racemes; fruit globose, 2–4 cm. in diameter, 1-seeded, the rind thick and green, the pulp white, agreeably acidulous. The fruits are employed for preparing cool beverages, and the roasted seeds are edible.

PAULLINIA L.

Large or small, woody vines; leaves pinnate or trifoliolate, or the lower leaflets replaced by pinnae of 3 or more leaflets; flowers small, white, in axillary racemes, these usually provided with tendrils; sepals 5; petals 4; stamens 8; fruit capsular, terete, angulate, or 3-winged, 1–3-seeded.—Other species grow in Central America. The plants of this genus and of *Serjania* are often employed in Central America as barbascos, that is, for stupefying fish, so that they float upon the surface of the water, where they may be caught easily.

Paullinia bracteosa Radlk. Bull. Herb. Boiss. II. 5: 321. 1905. Tuis, 650 meters, *Tonduz 11416.* Also in Panama. A large, almost glabrous vine; leaf rachis winged, the 5 leaflets large, coriaceous, elliptic-oblong, somewhat dentate; capsule terete, not winged, almost glabrous.

Paullinia costaricensis Radlk. Serjan. Suppl. 157. 1886. *Hoja de pájaro.* Type collected in Costa Rica. Common in thickets, region of San José to the Pacific coast. Ranging to Mexico. A small vine; leaves biternate, the leaflets narrow, lobate or dentate, pubescent or almost glabrous; capsule red, globose, 1–1.5 cm. long, not winged.

Paullinia costata Schlecht & Cham. Thickets near Tuis. Ranging to Mexico. Leaflets 5, oblong-elliptic, acuminate, entire,

glabrous, the rachis not winged; capsule globose, stipitate, tomentulose, 2–2.5 cm. long.

Paullinia Cururu L. Region of San José to the Pacific coast. Mexico to Brazil. Leaf rachis narrowly winged, the 3 leaflets lanceolate to elliptic, somewhat dentate, glabrous; capsule 3-angulate, pyriform, glabrous, 1.5–2.5 cm. long.

Paullinia Dodgei Standl., sp. nov.—Ramuli graciles grisei striati lenticellis parvis elevatis dense conspersi, novellis densissime breviter fulvo-pilosis; folia majuscula pinnata, 5-foliolata, petiolo gracili 4.5–7.5 cm. longo dense breviter fulvo-piloso exalato, rhachi 2.5–3.5 cm. longa superne angustissime alata vix ad 3 mm. lata; foliola membranacea ad 3 mm. longe petiolulata elliptica vel oblongo-elliptica, terminale interdum obovato-ellipticum, 8–12 cm. longa 4–6 cm. lata acuta vel subobtusa, basi obtusa vel rotundata, terminali basi cuneato vel saepius attenuato-decurrente, supra medium grosse crenata vel tantum undulata, crenaturis utroque latere circiter 4, supra in sicco laete viridia praesertim ad venas fulvo-puberula, nervis tenerrimis elevatis, venulis prominulis, subtus paullo pallidiora undique subdense breviter hirtella et minute glandulosa, nervis lateralibus utroque latere circiter 11 elevatis fere rectis sed superne paullo arcuatis in marginem desinentibus, venulis prominentibus reticulatis; inflorescentiae e ramis defoliatis vetustis nascentes racemosae solitariae vel fasciculatae usque 4.5 cm. longae fere ad basin densiflorae, rhachi gracili puberula, pedicellis aggregatis gracilibus ad 3 mm. longis minute puberulis valde inaequalibus, bracteis filiformibus floribus brevioribus, racemis primo comosis; alabastra globosa vix ultra 1.5 mm. diam., sepalis late rotundatis brunnescentibus sparse minute sericeis vel glabratis.—Low hills above Río Paquita, Prov. San José, 5–50 meters, August, 1936, *C. W. Dodge & V. F. Goerger 9877* (type in Herb. Field Mus.; dupl. in herb. Mo. Bot. Gard.).

Paullinia fasciculata Radlk. Collected only at Shirores. Ranging to French Guiana. Rachis winged, the 5 leaflets elliptic, dentate, glabrous; capsule pyriform, not winged, 2 cm. long, stipitate.

Paullinia fimbriata Radlk. Bull. Herb. Boiss. II. 5: 321. 1905. Near Tsaki, Talamanca, 400 meters, *Tonduz 9414*. Also in Panama. Rachis not winged, the 5 leaflets broadly elliptic, acuminate, somewhat dentate, pilose beneath; capsule trigonous-globose, tomentulose, short-stipitate.

Paullinia fuscescens HBK. Thickets and forest of the central region, ascending to 1,550 meters; San Ramón. Mexico to Ecuador. A small or large vine; leaves biternate, the leaflets acute, dentate, villous or almost glabrous beneath, the rachis marginate or narrowly winged; capsule 3-winged, 1–1.5 cm. long, reddish, short-stipitate.

Paullinia macrocarpa Radlk. Monogr. Paullin. 326. 1896. Turrialba, *Oersted.* Known only from the original collection. Rachis not winged, the 5 leaflets oblong, acuminate, almost entire, nearly glabrous; capsule fusiform, not winged, 4–4.5 cm. long, glabrous, the stipe 2.5 cm. long.

Paullinia mallophylla Radlk. Monogr. Paullin. 254. 1896. Type collected in Costa Rica by Oersted. Collected also in forests of Guanacaste, at 700 meters. Panama. Rachis narrowly winged or almost naked, the leaflets 3 pairs, the lowest ternate, oblong-lanceolate to elliptic, acute or acuminate, dentate, pubescent beneath or almost glabrous; capsule narrowly winged, tomentose.

Paullinia trisulca Radlk. Bull. Herb. Boiss. II. 5: 323. 1905. In thickets, Las Vueltas de Tucurrique, 650 meters, *Tonduz 12902.* Known only from the original collection. Rachis not winged, the 5 leaflets oblong-lanceolate, acuminate, remotely dentate, glabrous; capsule 3-winged.

Paullinia turbacensis HBK. Forests of Guanacaste, 500–700 meters. Ranging to Colombia. A small or large vine; rachis not winged, the 3 leaflets oblong or ovate or broadly elliptic, acute or acuminate, coarsely dentate, almost glabrous; capsule 3-angulate, pubescent, 2 cm. long, sessile.

Paullinia venusta Radlk. Bull. Herb. Boiss. II. 5: 324. 1905. Forests of Río Naranjo, 300 meters, *Pittier 7664.* Collected also at Finca La Colombiana. Endemic. Rachis winged; leaves with 4 pairs of leaflets, the lowest pair pinnate, each pinna with 5–7 leaflets, these lance-oblong, acute or acuminate, crenate, sessile, glabrous; capsule 3-winged, sessile, 1.5–2.5 cm. long, reddish.

SAPINDUS L. Soapberry

A single species is found in Central America.

Sapindus Saponaria L. *Jaboncillo.* Frequent in forests and thickets of the Pacific slope, ascending to 1,200 meters. Widely distributed in tropical America. A tree of 6–10 meters; leaves pinnate,

the 5–15 leaflets ovate or oblong, asymmetric, acuminate, entire, glabrous; flowers small, white, in large, terminal panicles; fruit globose, 1-seeded, 1.5 cm. in diameter, the pulp translucent. It is said that the wood is of excellent quality, but it is rarely employed in carpentry. The fruits are often used as a soap substitute, for they contain about 30 per cent of saponin. It is reported that in some parts of America the seeds are employed as a barbasco or fish poison.

SERJANIA Schumacher

Large or small, woody vines, the inflorescences usually provided with tendrils; leaves ternate, biternate, or ternate-pinnate; flowers small, white, racemose or paniculate; fruit of 3 samaras, the seed borne in the apical part of the samara.—Numerous other species grow in Central America, and no doubt still others are to be found in Costa Rica. The plants have no economic importance except for their use as barbascos, and it is probable that at present they are little used for that purpose in Costa Rica.

Serjania acuta Triana & Planch. Forests of the central region, 1,100–1,400 meters. Also in Panama. Leaves biternate, the leaflets oblong or lanceolate, entire, acuminate, pubescent beneath; flowers 3.5 mm. long, the sepals tomentulose.

Serjania atrolineata Sauv. & Wright. Forests and thickets of the tierra caliente. Mexico to Venezuela and Cuba. Branches subterete; leaves biternate, the leaflets oblong or lanceolate, acute, sparsely serrate, almost glabrous; samaras pubescent.

Serjania caracasana (Jacq.) Willd. Forests of the central region and the Pacific coast, ascending to 1,100 meters. A species of wide distribution. Branches terete; leaves biternate, the leaflets lanceolate or elliptic, acuminate, serrate, almost glabrous; samaras glabrous, 2–4 cm. long.

Serjania cardiospermoides Schlecht. & Cham. San Mateo, 200 meters. Ranging to Mexico. Branches 3-angulate; leaflets 3, ovate, acuminate, with a few teeth, somewhat pubescent or almost glabrous; samaras glabrous, 3.5 cm. long.

Serjania cornigera Turcz. Forests of Boruca. Also in Panama. Branches 5-angulate, pubescent; leaves biternate, the leaflets lanceolate, acute, dentate, soft-pilose beneath; flowers 7 mm. long; samaras setose-pilose; flowers 5 mm. long; samaras pubescent, 3–3.5 cm. long.

Serjania inebrians Radlk. Monogr. Serjan. 346. 1875. *Barbasco.* Ujarrás, 1,000 meters, *Oersted.* Collections from Guanacaste are probably referable to this endemic species. Branches obtusely 3-angulate; leaves biternate, the leaflets elliptic, petiolulate, acuminate, somewhat dentate, almost glabrous; flowers and samaras unknown.

Serjania membranacea Splitg. Reported from Puntarenas by Radlkofer. Ranging to the Guianas. Branches 5–6-angulate; leaves biternate, the leaflets ovate, somewhat dentate, almost glabrous; petals 3 mm. long; samaras glabrous, 3.5 cm. long.

Serjania mexicana (L.) Willd. Common in the tierra caliente; region of San Ramón. Widely distributed in tropical America. Branches sometimes prickly; leaves biternate, the leaflets oblong to ovate, obtuse or acute, dentate, almost glabrous; flowers 3 mm. long; samaras glabrous or somewhat puberulent, 2–2.5 cm. long.

Serjania pteropoda Standl., sp. nov.—Ramuli juniores glabri subacute 6-angulati, internodiis elongatis; folia majuscula biternata, petiolo nudo angulato 2–2.5 cm. longo, rhachi anguste alata superne ad 5 mm. lata, alis basin versus attenuato-angustatis; foliola sessilia obovato-elliptica vel elliptico-oblonga 7–12 cm. longa 3–5 cm. lata apice abrupte acute acuminata, basi cuneato-angustata, interdum supra basin paullo contracta, chartacea, glabra, lucida, prope apicem grosse crenata, crenaturis utroque latere 2–3, aliter integra, costa nervisque supra prominulis, costa subtus prominente gracillima, nervis lateralibus utroque latere ca. 7 arcuato-adscendentibus remote a margine conjunctis, venulis inconspicuis subarcte reticulatis; inflorescentiae ut videtur racemiformes angustae longipedunculatae, rhachi dense breviter sordido-pilosa, pedicellis circiter 5 mm. longis gracilibus; fructus immaturus 2 cm. longus paullo ultra 1 cm. latus basi cordatus apicem versus paullo angustatus fere ubique sparse pilosus, loculis densissime sordido-hirsutis.—Colinas del Tremendal (San Pedro) de San Ramón, April, 1935, *Brenes 20509* (type in Herb. Field Mus.). Also *No. 18999* from the same locality. The fruits are very immature, and their detailed structure not obvious; the branches of the available specimens are too young for satisfactory diagnosis of their structure. In leaf form alone the plant is clearly unlike any other species of *Serjania* known from the region.

Serjania racemosa Schumacher. Forests and thickets of the Atlantic slope, 500–1,000 meters. Extending to Mexico. Branches

obtusely angulate; leaves biternate, the leaflets ovate, acute or acuminate, somewhat serrate, pubescent beneath; flowers 3 mm. long; samaras almost glabrous, 1.5–2.5 cm. long.

Serjania rhombea Radlk. Thickets of the Pacific tierra caliente. Mexico to Venezuela and Ecuador. Branches 5-angulate; leaves biternate, the leaflets ovate, acute or obtuse, sessile, serrate, pubescent; flowers 2 mm. long; samaras pilose, 2 cm. long.

Serjania rufisepala Radlk. *Bejuco juriso.* Valley of the Reventazón, 1,000 meters. Guatemala to Panama. Branches 6-sulcate; leaves biternate, the leaflets elliptic or elliptic-lanceolate, acuminate, sessile, entire, glabrous; flowers 2.5 mm. long; samaras pubescent, 2 cm. long or larger. Pittier reports that the strong stems of this and other species are employed for making the baskets used in gathering coffee berries.

Serjania sordida Radlk. *Bejuco juriso.* Common in thickets of the Meseta Central; San Ramón, at 1,000 meters. Ranging to Mexico. Branches 6-sulcate, pubescent; leaves biternate, the leaflets elliptic, acute or obtuse, tomentose beneath, entire; flowers 2.5 mm. long; samaras pubescent, 2.2 cm. long.

Serjania triquetra Radlk. Dry thickets and forests of the Pacific coast. Ranging to Mexico. Branches 6-sulcate; leaves biternate, the leaflets ovate, sessile, obtuse or acute, dentate, pubescent; samaras pubescent, 2.2 cm. long.

Serjania Valerii Standl., sp. nov.—Scandens fruticosa, ramis obtuse 5-gonis dense hirsutis; corpus lignosum ut videtur simplex; folia pinnata petiolata, foliolis 5 oblongis vel ovatis vel ellipticis acuminatis vel longe anguste attenuatis, basi obtusis, terminali basin versus sensim cuneato, grosse dentatis, membranaceis, sessilibus, utrinque densiuscule hirsutis; petiolus ut rhachis nudus; thyrsi solitarii foliis aequilongi vel breviores, pedicellis fructiferis usque ad 1 cm. longis; bracteae bracteolaeque ovatae acutae; sepala 4–4.5 mm. longa tomentulosa; fructus ovali-oblongus 4 cm. longus 2.5 cm. latus setoso-pilosus superne paullum angustatus apice truncatus, basi cordatus, loculis dorso usque ad apicem late cristatis 1.5 cm. longis.—In forest, Colinas de San Pedro de San Ramón, 1,075 meters, *Brenes 4532* (type in Herb. Field. Mus.). Wet forest, Tejona, north of Tilarán, Guanacaste, 700 meters, *Standley & Valerio 45835*. Similar in most of its characters to *S. cornigera*, which differs in its biternate leaves and fruit emarginate at the apex. A woody vine with white flowers; samaras red.

TALISIA Aubl.

Other Central American species of the genus are known.

Talisia oliviformis (HBK.) Radlk. *Dantisca.* Forests of Guanacaste, 600 meters. Mexico to Venezuela. A tree of 8–15 meters; leaves pinnate, the 4 leaflets elliptic to narrowly oblong, acuminate or obtuse, entire, glabrous, coriaceous; flowers small, whitish, in axillary panicles; sepals and petals 5; stamens 8; fruit a globose berry 1.5–2.5 cm. or more in diameter, usually 1-seeded. The acid fruit is edible, but it is little eaten in Central America.

THOUINIA Poit.

Two or three other species occur in Central America.

Thouinia velutina Radlk. Bull. Herb. Boiss. II. 5: 326. 1905. Thickets near Nicoya, 300 meters, *Tonduz 13929.* Known only from the original collection. A shrub; leaflets 3, lanceolate, acuminate, dentate, puberulent; inflorescence axillary, narrow, 7–12 cm. long, the flowers small, white; fruit of 2 or 3 samaras 2 cm. long.

THOUINIDIUM Radlk.

No other species are known from Central America.

Thouinidium decandrum (Humb. & Bonpl.) Radlk. Between Guachipelín and Volcán de La Vieja, Guanacaste, *Brenes 15521.* Ranging to western Mexico. A slender tree, usually 5–9 meters high, with smooth, gray bark; leaves even-pinnate, the 6–14 leaflets coriaceous, linear-lanceolate, acuminate, serrate, glabrous or nearly so, finely reticulate-veined; flowers 3 mm. long, white, in terminal panicles; fruit of 2–3 laterally compressed, glabrous samaras 4 cm. long.

URVILLEA HBK.

A single species occurs in Central America.

Urvillea ulmacea HBK. Thickets of the Pacific tierra caliente. Widely distributed in tropical America. A woody vine; inflorescences provided with tendrils; leaflets 3, ovate, 3–7 cm. long, acuminate, crenate, pubescent; flowers white, in axillary racemes; sepals 5; petals 4; stamens 8; fruit membranaceous, 2–3 cm. long, 3-angulate, the angles winged.

SABIACEAE. Sabia Family

The family is represented in Central America by a single genus.

MELIOSMA Blume

Reference: Urban, Symb. Antill. 1: 503. 1900.

Trees or shrubs; leaves simple, alternate, petiolate; flowers perfect or polygamo-dioecious, in branched racemes; sepals 5, rarely 3; petals 5, the 2 inner ones narrower; stamens 3, opposite the outer petals; fruit drupaceous, the stone 1-celled, 1-seeded.—Other species occur in Central America.

Meliosma Brenesii Standl., sp. nov.—Arbuscula 3–4-metralis, trunco humili, ramulis crassis ochraceis rimosis, novellis subdense pilis patentibus fulvo-pilosis vel hirsutis apice dense foliatis, internodiis brevibus; folia subcoriacea fere sessilia vix ultra 5 mm. longe petiolata oblongo-oblanceolata 10–17 cm. longa 3–4.5 cm. lata sensim longiacuminata, basin versus sensim longiangustata, interdum integra sed saepius remote hinc inde serrata, in sicco fusca, supra sparse praesertim ad nervos fulvo-hirsuta, costa subimpressa, venis prominulis, subtus subdense crispo-villosa vel hirsuta, costa gracili elevata, nervis lateralibus utroque latere circiter 12 angulo semirecto arcuato-adscendentibus elevatis, venulis valde elevatis laxe reticulatis; inflorescentia racemosa vel racemiformis brevis sessilis vel subsessilis, rhachi dense fulvo-hirsuta, floribus sessilibus; sepala orbicularia circiter 2 mm. longa extus sicut intus glabra, marginibus dense ciliatis, subpatentia; petala glabra alba suborbicularia fere 3 mm. longa; fructus subglobosus 2 cm. diam. glaber.—Forests of La Paz de San Ramón, 1,050 meters, *Brenes 5556* (type in Herb. Field Mus.). Related to *M. vernicosa*, which has relatively broader leaves on much longer petioles.

Meliosma glabrata (Liebm.) Urban, Ber. Deutsch. Bot. Ges. 13: 212. 1895. *Ira* (fide Oersted). *Lorenzanea glabrata* Liebm. Vid. Medd. Kjoebenhavn 71. 1850. *L. Ira* Liebm. loc. cit. (Naranjo, *Oersted*). Turrialba, *Oersted*. Wet forests of the Atlantic slope, 1,200–1,700 meters; region of San Ramón and in Atlantic Guanacaste. Endemic. A tree of 6–8 meters, the branches glabrous or somewhat strigose; leaves oblanceolate-oblong, 10–25 cm. long, short-acuminate, attenuate to the base, dentate or almost entire; flowers small, white, the panicles short or elongate and many-flowered; style twice as long as the ovary; drupe 2 cm. long.

Meliosma idiopoda Blake, Journ. Wash. Acad. Sci. 14: 289. 1924. Forests of Las Vueltas, Tucurrique, 700 meters, *Tonduz 13372*. Known only from the original collection. Very similar to the pre-

ceding species, of which it is perhaps only a form; style shorter than the ovary.

Meliosma irazuensis Standl. in Cufodontis, Archivio Bot. 9: 194. 1933. Near Guayabillos, Volcán de Irazú, 2,500 meters, *Cufodontis 451*. Known only from the original collection. A tree of 20 meters, the young branches densely pilose; leaves short-petiolate, coriaceous, oblong-oblanceolate, 6.5–8 cm. long, acute, entire, almost glabrous; panicles 12 cm. or more in length, hispidulous.

Meliosma subcordata Standl., sp. nov.—Arbuscula 3–4-metralis, ramulis crassis subteretibus tomento densissimo adpresso furfuraceo fulvo indutis, internodiis brevibus; folia crasse coriacea breviter petiolata, petiolo crasso dense tomentoso usque 1 cm. longo; lamina obovato-oblonga 8.5–15 cm. longa 3.5–6.5 cm. lata acuta vel subabrupte breviter acuminata, basin versus paullo angustata, basi ipsa lata et subprofunde cordata, interdum truncata, integra vel subintegra, in sicco brunnescens, supra sublucida, praesertim ad nervos arcte furfuraceo-tomentosa vel glabrata, costa subimpressa, venulis obsoletis, subtus fere concolor, ubique subdense minute glanduloso-furfuracea et ad nervos hirtella vel serius glabrata, costa crassiuscula elevata, nervis lateralibus utroque latere circiter 12 elevatis angulo latiusculo adscendentibus fere rectis prope marginem conjunctis, venulis valde elevatis laxe reticulatis; inflorescentiae terminales et axillares anguste pyramidato-paniculatae breviter pedunculatae usque 11 cm. longae atque 7 cm. latae sublaxe multiflorae, ramis patentibus crassiusculis dense hirtellis et glandulosis, floribus plus minusve aggregatis sessilibus vel brevissime crasse pedicellatis; sepala suborbicularia circiter 1.5 mm. longa ciliata, extus glanduloso-scaberula vel glabrata; petala suborbicularia glabra fere 3 mm. longa; ovarium glabrum in stylum 2 mm. fere longum sensim attenuatum; fructus subglobosus glaber usque 2.5 cm. longus.—La Laguna de San Ramón, 1,150 meters, *Brenes 3781* (type in Herb. Field Mus.). La Palma de San Ramón, *Brenes 5812*. Well marked by the broad and usually cordate leaf bases.

Meliosma Tonduzii Donn. Smith, Bot. Gaz. 55: 432. 1913. Las Vueltas, Tucurrique, 650 meters, *Tonduz 13368*. Also in Talamanca. Endemic. A tree, the branches glabrous; leaves oblanceolate, 13–18 cm. long, short-acuminate, glabrous, denticulate or entire; panicles pubescent, 13 cm. long, the flowers 3 mm. long; drupe pyriform, 2.5 cm. long; style twice as long as the ovary.

Meliosma vernicosa (Liebm.) Griseb. Cat. Pl. Cub. 47. 1866. *Lorenzanea vernicosa* Liebm. Vid. Medd. Kjoebenhavn 72. 1850. Naranjo, *Oersted.* Known only from the original collection. Branches densely pubescent; leaves obovate, 10–17 cm. long, obtuse, not narrowed to the base, entire, pilose; style twice as long as the ovary; drupe 2 cm. long.

BALSAMINACEAE. Touch-me-not Family

Reference: Rydberg, N. Amer. Flora 25: 93. 1910.

The family consists of a single genus.

IMPATIENS L.

Fleshy, annual herbs; leaves simple, alternate, petiolate, without stipules; flowers perfect, solitary or racemose in the leaf axils; sepals 3, the posterior one produced into a spur; petals 5 or 3; stamens 5; fruit a capsule, elastically dehiscent at maturity.—A single native species is known from Central America.

Impatiens Balsamina L. *China, Chinarosa.* The balsam or touch-me-not is a common ornamental plant of gardens, with either single or double flowers of various colors. Native of Asia.

Impatiens Sultani Hook. *Sultana, China.* An ornamental garden plant, sometimes becoming naturalized about dwellings. Native of Africa. Flowers usually bright red, but sometimes pink or white.

Impatiens turrialbana Donn. Smith, Bot. Gaz. 23: 241. 1897. Puente del Birrís, Volcán de Turrialba, *Pittier 885.* Frequent in forests on the slopes of Turrialba and Irazú, at 1,700–2,000 meters. Endemic. A branched annual, glabrous; leaves oblong-elliptic, 5–7 cm. long, acute, somewhat serrate; flowers brilliant red, about 2 cm. long. A very beautiful plant because of its showy and brilliantly colored flowers, which are strongly suggestive of those of the native species of *Tropaeolum,* with which this often grows.

RHAMNACEAE. Buckthorn Family

Trees or shrubs, sometimes scandent or armed with spines; leaves simple, stipulate, alternate; inflorescence generally cymose or paniculate, the flowers small, regular, perfect or polygamous; calyx with 4 or 5 teeth or lobes; petals 4 or 5 or none, inserted upon the calyx; stamens 4 or 5, opposite the petals and inserted with them; disk fleshy; ovary sessile, 2–5-celled, the cells 1–2-ovulate; fruit dry

or fleshy, the seeds solitary in the cells.—A few other genera are represented in Central America.

COLUBRINA Rich.

Trees or shrubs, sometimes armed with spines; leaves petiolate, sometimes with glands on the lower surface; flowers fasciculate in the leaf axils; petals 5; fruit capsular.—Other species are known from Central America.

Colubrina heteroneura (Griseb.) Standl. *Cormonema Nelsoni* Rose; *Colubrina spinosa* Donn. Smith, Bot. Gaz. 23: 4. 1897 (forests of Boruca, *Tonduz 4569*). Known in Costa Rica only from the locality cited. Panama to Mexico. A shrub or tree of 7 meters or less, armed with spines; leaves elliptic or almost orbicular, 4–6 cm. long, obtuse or rounded at the apex, entire or nearly so.

Colubrina ovalifolia (Donn. Smith) Standl., comb. nov. *Cormonema ovalifolium* Donn. Smith, Bot. Gaz. 23: 239. 1897. Along Río Zhorquín, Talamanca, 50 meters, *Tonduz 8507*. Known only from the original collection. Leaves oval, short-acuminate, 8.5–14 cm. long, glabrous; capsule 9 mm. long.

Colubrina panamensis Standl. Forests of the Atlantic coast. Also in Panama. A tree of 4.5–9 meters, unarmed, glabrous; leaves oval to oblong-elliptic, 12–21 cm. long, acute or short-acuminate. This species probably is synonymous with *C. ovalifolia*, the type of which I have not seen.

GOUANIA Jacq.

Shrubs, sometimes scandent by tendrils; leaves petiolate; flowers small, white, polygamous, in racemes or paniculate spikes; petals 5; fruit dry, 3-winged, at maturity separating into 3 nutlets.—Three or four species are known in Central America.

Gouania lupuloides (L.) Urban. Common in thickets or open woods of the tierra caliente. Widely dispersed in tropical America. Leaves ovate or elliptic, 3–10 cm. long, acute, serrate, glabrous or nearly so; capsule 8–12 mm. broad. The plant is sometimes employed in Central America as a substitute for soap, in washing clothes. The dried and pulverized stems are employed in Europe and the United States for the preparation of dentifrices.

Gouania polygama (Jacq.) Urban. Thickets of the Pacific slope. A species of wide distribution in tropical America. Similar

to the preceding species, but the leaves pubescent or tomentose beneath.

RHAMNUS L.

Shrubs or small trees; leaves petiolate, entire or serrate; flowers racemose, cymose, or paniculate; petals 4 or 5 or none; fruit a drupe. —There probably are other species in Central America.

Rhamnus capreaefolia Schlecht. Forests of El Copey. Ranging to Mexico. A small tree; leaves elliptic or ovate, narrow-acuminate, 5–14 cm. long, serrulate, pubescent; flowers in short-pedunculate or almost sessile cymes; drupes 5–7 mm. long.

Rhamnus Humboldtiana Roem. & Schult. Cerro de Las Vueltas, 3,000 meters. Also in northern South America. A shrub of 3–4.5 meters; leaves oblong-lanceolate, narrow-acuminate, finely serrulate, coriaceous, almost glabrous; flowers solitary or fasciculate in the leaf axils.

Rhamnus pubescens (Ruiz & Pavón) Triana & Planch. *Durazznillo.* Forests and quebradas in the region of Cartago, 1,300–1,500 meters. Ranging to South America. A small tree; leaves long-petiolate, oblong-lanceolate or elliptic-oblong, 7–18 cm. long, narrow-acuminate, serrulate, pubescent beneath; peduncles elongate, the cymes many-flowered; drupes 6 mm. long.

SAGERETIA Brongn.

A single species is known from Central America.

Sageretia elegans (HBK.) Brongn. Thickets of the Meseta Central. Mexico to Peru. A shrub of 2–4 meters, the branches sometimes pendent or subscandent, usually armed with spines; leaves subopposite, short-petiolate, lanceolate to elliptic, acute, serrulate, tomentulose beneath when young but later almost glabrous; flowers minute, white, in large panicles; drupes 6–8 mm. in diameter.

ZIZYPHUS Adans.

No other species are known in Central America.

Zizyphus guatemalensis Hemsl. Bahía de Salinas; Guanacaste. Also in Guatemala. A somewhat spiny shrub; leaves petiolate, glabrous, ovate to almost orbicular, obtuse or rounded at the apex, 3-nerved, serrulate; flowers small, green, in pedunculate cymes.

VITACEAE. Grape Family

Scandent shrubs, mostly with tendrils; leaves alternate, simple or compound, petiolate; flowers small, perfect or polygamous, usually cymose; calyx entire or denticulate; petals 4 or 5, valvate; stamens 4 or 5, opposite the petals; fruit a 1–4-celled berry.—No other genera are known from Central America.

AMPELOCISSUS Planch.

One or two other species occur in Central America.

Ampelocissus costaricensis Lundell, Carnegie Inst. Wash. Publ. 478: 215. 1937. Type from Costa Rica, without definite locality, *United Fruit Co. 383*. Thickets of the tierra caliente. Endemic. An often prostrate vine, trailing over the ground; leaves broadly cordate, 7–16 cm. long, dentate and angulate or somewhat lobate, tomentose or glabrate beneath, at least when young; staminate flowers in very dense and large cymes, red; berries wine-colored, 1.5–2 cm. in diameter. Noteworthy for the large and handsome fruits, as fine in appearance as the best grapes, but very sour and scarcely edible.

CISSUS L.

Scandent shrubs; leaves simple or ternate, usually fleshy; flowers generally perfect, with 4 sepals and petals, cymose-corymbose; ovary 2-celled; fruit 1–4-seeded, not edible.—Other species grow in Central America.

Cissus biformifolia Standl. Field Mus. Bot. 4: 225. 1929. *C. cardiophylla* Standl. op. cit. 226 (Boca Banana, Atlantic coast, *Tonduz 9154*). Changuinola Valley, *Dunlap 323*. Forests and thickets of the Atlantic tierra caliente; San Ramón, at 1,150 meters. Panama to Guatemala. A large vine; lower leaves large, cordate, acuminate, 10–20 cm. long, glabrous, the upper ones shorter, oblong to ovate, rounded to almost acute at the base; flowers dark red; berries 1 cm. long.

Cissus brevipes Morton & Standl., sp. nov.—Frutex scandens omnino glaber, ramis subgeniculatis obtuse angulatis ferrugineis lenticellis numerosis parvis pallidis notatis, internodiis brevibus; folia modica breviter petiolata carnosa in sicco subcoriacea et fusca, petiolo crassiusculo 6–11 mm. tantum longo; lamina lanceolato-oblonga 6–8.5 cm. longa 2.5–3.5 cm. lata subabrupte anguste acuminata, basi obtusa, supra opaca, costa nervisque prominentibus,

subtus concolor, costa gracili prominente, nervis lateralibus utroque latere 5–6 tenerrimis arcuatis angulo latiusculo adscendentibus pallidis in marginem desinentibus, margine remote salienti-serrato; cymae oppositifoliae breviter crasse pedunculatae ca. 5 cm. latae et paullo breviores, subdense multiflorae, floribus viridescentibus umbellatis, pedicellis crassis angulatis 2–3 mm. longis, fructiferis ad 7 mm. longis; calyx patelliformis fere 2 mm. latus truncatus viridis; petala 2 mm. longa; fructus oblique globoso-ovoideus ca. 10 mm. longus atque 6 mm. latus acutus vel acuminatus, basi subcontractus. —Vicinity of El General, Prov. San José, 950 meters, December, 1935, *Alexander F. Skutch 2256* (type in U. S. Nat. Herb.; photo. in Herb. Field Mus.).

In foliage this species is similar to some of the forms of *C. biformifolia*, but it is conspicuously different from all of them in the short-petiolate leaves, those of that species being all conspicuously long-petiolate.

Cissus rhombifolia Vahl. *Vitis rhombifolia* Baker. Common in thickets and forest, Meseta Central to the coasts. Widely distributed in tropical America. Leaflets 3, rhombic or ovate, acuminate, somewhat serrate, pubescent or almost glabrous; flowers red. Reported by Hemsley under the name *Vitis trifoliata* Jacq. With little doubt, there exists in Costa Rica *C. salutaris* HBK., a similar plant, but with obtuse, glabrous leaflets.

Cissus sicyoides L. *Iasú. Vitis sicyoides* Miq. Abundant in forest and thickets, Meseta Central to the coasts. Widely distributed in tropical America. A large vine, sometimes climbing to the tops of tall trees; leaves simple, broadly ovate or ovate-oblong, 3–12 cm. long, serrate, truncate or somewhat cordate at the base; flowers green; berries black, 7–10 mm. long. It is stated that the acrid sap sometimes produces blisters upon the skin, and that the leaves when crushed in water produce an abundant suds. The plant often produces many adventitious roots that descend to the ground. The flexible stems are used in country regions as a substitute for string, and for weaving baskets. The inflorescences often are attacked by a fungus (smut) which so transforms their appearance that they resemble some parasitic plant. In some parts of Central America the vine receives such names as Comemano and Picamano.

Cissus Martiniana Woodson & Seibert. Occasional in mountains of the central region, 1,800–2,400 meters. Described from Chiriquí, Panama, and in Honduras. A small, almost glabrous

vine, the branches sometimes sparsely brown-hirtellous; leaflets 3, rhombic-oblong or obovate-oblong, 2–4.5 cm. long, obtuse or rounded at the apex, cuneately narrowed at the base, coarsely crenate above the middle or merely serrulate; flowers small, green; berries white. I have not seen authentic material of *C. Martiniana*, but the description agrees well with the Costa Rican and Honduran material, which I had believed to represent an undescribed species.

VITIS L. Grape

In Central America there is a single native species.

Vitis tiliifolia Humb. & Bonpl. *Agrá, Parra, Uva. V. caribaea* DC.; *V. arachnoides* Oerst. Vid. Medd. Kjoebenhavn 11. 1855 (type collected at an elevation of 1,150 meters by Oersted); *V. acuminata* Oerst. op. cit. 57. 1856 (type collected by Oersted at an elevation of 1,150 meters). Common in forest and thickets, Meseta Central to the coasts, ascending to 1,500 meters. Widely distributed in tropical America. A large vine, the trunk sometimes 20 cm. in diameter; leaves long-petiolate, large, cordate, serrate, sometimes trilobate, tomentose beneath; flowers small, green, fragrant, in dense panicles; berries purple-black, 6–8 mm. in diameter, very acid. The fruits are so sour that they are not eaten, but they are sometimes utilized as the basis of vinegar. Known in Panama by the name Bejuco de agua. Of this plant Pittier writes: "Known for the pure water, of slightly astringent flavor, that runs from sections of the stem when these are separated and handled with the proper dexterity. A piece a meter long will fill an ordinary glass, and the frequent distribution of this plant in the forests has saved the life of more than one woodsman who had lost his way and was dying from thirst. The water is reputed diuretic and efficacious as a remedy for venereal diseases." Indian names reported by the same author are: Gsa-kitsha-dié (Cabécara); Bi-kro-kitsha, Bisurur-kitsha (Bribrí); Bi-u-tshá (Brunka); Sirisir (Guatuso).

Vitis vinifera L. *Uva, Parra.* The European grape is sometimes planted in various parts of Costa Rica, especially in Guanacaste, but it does not thrive, as a rule, in Central America. I have been told that its worst enemy is the zompopo, the large leaf-cutting ant. The European grape is cultivated extensively in some parts of Mexico and South America, especially for wine production, also in western United States. The grapes produced so abundantly in eastern United States are derived from native North American species of *Vitis*.

TILIACEAE. Linden Family

Trees, shrubs, or herbs; leaves alternate, simple; pubescence often of branched hairs; stipules mostly small and deciduous; flowers perfect, solitary or in cymes or panicles; sepals generally 5, rarely 3 or 4, valvate, deciduous; petals of the same number as the sepals, sometimes none; stamens 5–10 or numerous, sometimes united in fascicles; ovary sessile, 2–10-celled, the styles united; fruit capsular, baccate, or drupaceous.—A few other genera occur in Central America. There are included here certain genera, such as *Muntingia* and *Sloanea*, which are referred by some authors to a distinct family, Elaeocarpaceae.

APEIBA Aubl.

Trees; leaves short-petiolate, oblong to ovate, acuminate, 5-nerved at the base; flowers large, cymose, the petals yellow; fruits rounded and somewhat depressed, 3–10 cm. in diameter, covered with numerous flexible or hard spines.—In North America there are only two species. The genus may be recognized readily by its unique fruits, which resemble sea urchins.

Apeiba aspera Aubl. *Peine de mico.* Common in forests of the Atlantic tierra caliente. Ranging to Brazil. A medium-sized tree; leaves entire or nearly so, glabrous above, minutely tomentulose beneath, rounded at the base; spines of the fruit short and hard; flowers about 2 cm. long.

Apeiba Tibourbou Aubl. *Peine de mico, Burío.* Common in forests of the Pacific tierra caliente. Mexico to Brazil. A medium-sized tree; leaves stellate-tomentose, cordate at the base, serrate; spines of the fruit long and flexible. The wood is white and soft. The bark contains a strong fiber that is used in the country for tying various articles. Pittier reports as Indian names Kura-krá (Brunka) and Kutshin-gró (Térraba).

BELOTIA A. Rich.

Reference: Sprague, Kew Bull. 270. 1921.

Large or medium-sized trees; leaves short-petiolate, 3-nerved, stellate-pubescent beneath; flowers arranged in small cymes, with violet petals and pink sepals; capsule 2-celled, compressed, broadly obcordate, 2 cm. wide or larger, containing numerous hairy seeds.—These trees often spring up abundantly in cut-over lands in the Central American tierra caliente. They are strikingly showy when in flower, because of the great profusion of handsomely colored blossoms.

Belotia panamensis Pittier. Reported from the region of El General as collected by Skutch; determined by C. V. Morton as *B. macrocarpa* Sprague, a synonym of *B. panamensis*. Also in Panama. A tree of 6–12 meters or more; leaves oblong-lanceolate, long-acuminate, finely serrate, green above, pale beneath and covered with a dense tomentum, this consisting of two elements—a minute, close tomentum and scattered, conspicuously longer, stellate hairs; flowers about 3 cm. broad.

Belotia reticulata Sprague. Río Sándalo, Península de Osa, at sea level, *Dodge & Goerger 10077*. Also in Nicaragua. Leaves green above, covered beneath with a very minute and closely appressed, whitish tomentum, oblong to ovate-lanceolate, as much as 25 cm. long, narrowly long-acuminate, denticulate-serrulate; sepals about 1 cm. long.

CORCHORUS L.

Herbs or small shrubs; leaves serrate; flowers small, yellow, solitary or fasciculate, axillary or opposite the leaves; ovary 2–5-celled; fruit a linear capsule, with 2 or more cells.—Other species are known in Central America. *Corchorus capsularis* L., an Asiatic species, is the source of jute (*yute*), an important commercial fiber.

Corchorus hirtus L. Occasional in thickets and waste places of the Pacific tierra caliente. Widely distributed in tropical America. A low, slender, branched herb, copiously short-hirsute throughout; leaves lance-oblong, acuminate or obtuse; capsule acuminate, usually hirsute.

Corchorus orinocensis HBK. Waste ground, frequent in thickets, Meseta Central to the Pacific coast. A species of wide distribution. A perennial or annual herb 30–60 cm. high, somewhat pubescent; leaves lanceolate or ovate, 4–10 cm. long, acuminate, almost glabrous; flowers 5 mm. long; capsule 4–7 cm. long, acuminate, glabrous or nearly so.

Corchorus siliquosus L. Common in waste ground of the coasts. A species of wide distribution. A shrub of 1 meter or less, branched; leaves ovate or oblong-lanceolate, 1–5 cm. long, acute or acuminate; capsule obtuse, compressed, 5–8 cm. long.

DICRASPIDIA Standl.

A monotypic genus, endemic in Central America.

Dicraspidia Donnell-Smithii Standl. Field Mus. Bot. 4: 227. 1929. Forests of the tierra caliente. Type collected in the valley

of Río Changuinola, *Dunlap 439*. Llanuras del Río Corredor, Golfo Dulce, *Pittier 11172;* Boca Culebra, Río Savegre, *Pittier 12156*. Also found in Panama and Honduras. A shrub or small tree of 3–4 meters with smooth bark; leaves short-petiolate, lance-oblong, acuminate, crenate, somewhat cordate and oblique at the base, green above, white and very densely tomentose beneath, the hairs stellate; flowers large, solitary, inserted above the leaf axils, 5 cm. wide; ovary inferior; fruit a globose berry 1.5 cm. in diameter. A curious plant, in some of its details conspicuously different from other members of the family. Easy to recognize because of its unique stipules, which are large, foliaceous, rounded, dentate, and peltate. There are few plants with peltate stipules, and probably no other one in Central America.

DOMBEYA Cav.

Dombeya Wallichii (Lindl.) Benth. & Hook. Cultivated for ornament in gardens of San José, and perhaps elsewhere. Said to be native in Madagascar. A large shrub or small tree with very large, broadly cordate, long-petiolate, densely velvety-stellate leaves; flowers large, pink or red, in large, dense, long-stalked, pendent umbels.

GOETHALSIA Pittier

The genus contains a single species.

Goethalsia meiantha (Donn. Smith) Burret, Notizbl. Bot. Gart. Berlin 9: 815. 1926. *Luehea meiantha* Donn. Smith, Bot. Gaz. 24: 394. 1897; *G. isthmica* Pittier. Jiménez, Llanuras de Santa Clara, 270 meters, *J. D. Smith 6623*. Collected also at Rosario, in the same region. Occurring in Panama and Colombia. A tree of 15 meters or more; leaves short-petiolate, elliptic-oblong or obovate-oblong, narrow-acuminate, somewhat dentate, 3-nerved, green on the upper surface, pale and minutely tomentulose beneath; flowers small, cymose; fruit composed of 3 large, oblong, broadly winged samaras united near the base by their central surface.

HELIOCARPUS L.

Reference: E. E. Watson, Bull. Torrey Club 50: 109. 1923.

Trees, the pubescence all or partly of stellate hairs; leaves large and broad, long-petiolate, dentate and sometimes lobate; flowers small, greenish or yellowish, in large panicles; fruit dry, indehiscent, elliptic, hard, provided on the margin with a dense series of long, pilose bristles.—A few additional species occur in

Central America. The wood is whitish, soft, and spongy, of regular grain; it has few uses. The strong fiber obtained from the bark is suitable for making carrying bags, twine, etc.

Heliocarpus appendiculatus Turcz. *Burío.* Common in thickets and forest of the tierra caliente; San Ramón. Panama to Mexico. A tree of 6–18 meters; leaves with foliaceous appendages at the base of the blade, green on the upper surface, pale beneath and covered with a fine tomentum; fruit stipitate. The bark is brownish and smooth. Pittier reports as Indian names Tsa-ri (Cabécara); Stsa (Bribrí); Gshii-krá (Brunka); Rush-ura-gró (Térraba). In Panama this species is known by the name Majagüillo.

Heliocarpus Donnell-Smithii Rose. *Burío.* Pastures of Cantón de Dota, 1,500 meters. Extending to southern Mexico, and in Martinique. A tree of 6–15 meters; leaves not appendaged, green, almost glabrous but rough to the touch; fruit stipitate, sometimes purple.

Heliocarpus excelsior Morton, Journ. Wash. Acad. Sci. 27: 307. 1937. Vicinity of El General, Prov. San José, 1,100 meters, *Skutch 2250.* Known only from the type locality. A tree of 36 meters; leaves appendaged at the base, large, sinuate-trilobate toward the apex, shallowly cordate at the base, serrulate, very minutely stellate-puberulent on both surfaces; sepals 6 mm. long; fruit stipitate, densely pilose. Similar to *H. appendiculatus*, but with concolorous leaves, those of that species being much paler beneath.

Heliocarpus mexicanus (Turcz.) Sprague. *Burío, Buriogre. H. glanduliferus* Robinson. Thickets of the Meseta Central. Extending to Mexico. A medium-sized tree; leaves ovate to lanceolate, narrower than in the other species, pubescent or almost glabrous; fruit sessile.

Heliocarpus rudis E. E. Watson. Forest and thickets of the Meseta Central. Also in Panama. A medium-sized tree; leaves broad, densely stellate-tomentose on both surfaces; fruit stipitate.

LUEHEA Willd.

Trees, rarely shrubs; leaves finely dentate, 3–5-nerved; flowers large and showy, white, in axillary cymes; calyx subtended by numerous bractlets; capsule large, woody, 5-celled, terete or 5-angulate, with numerous seeds.—No other species are known from Central America.

Luehea candida (DC.) Mart. *Molenillo, Guácimo, Guácimo molenillo.* Common in forests of the Pacific coast; San Ramón; ascending to 1,100 meters. Mexico to Colombia. A medium-sized or sometimes a large tree; leaves short-petiolate, ovate to elliptic or almost orbicular, green or pale beneath and stellate-pubescent; petals 5 cm. long; capsules with acute angles. The name molenillo is given on account of the fruit, which, when dry and cleaned of its seeds, is fastened at the tip of a stick and used for beating chocolate to a froth.

Luehea Seemannii Triana & Planch. *Guácimo, Guácimo macho.* Abundant in the forests of the tierra caliente, but rarely found above 300 meters. Panama to Guatemala. A giant tree, often more than 30 meters tall, the trunk very thick; leaves oblong to obovate, covered beneath with a fine, brown tomentum; petals 1 cm. long; capsule small, only 2–2.5 cm. long, deeply 5-lobate. This is one of the giant trees of Central American forests, with a trunk as much as 2 meters in diameter, and often furnished with tall, broad buttresses. The wood, unfortunately, is weak, and has few or no uses. In Nicaragua and Panama this species is called Guácimo colorado.

Luehea speciosa Willd. *Guácimo macho. L. platypetala* A. Rich. Reported only from the region of Nicoya. Mexico to Brazil and West Indies. A tall or medium-sized tree, sometimes flowering when only a shrub of 2 meters; leaves elliptic or oval, pale and tomentose beneath; petals 3–4.5 cm. long; capsule 3–4 cm. long, the angles obtuse.

MUNTINGIA L.

A single species occurs in Central America.

Muntingia Calabura L. *Capulín.* Common in thickets of the Pacific coast. Widely distributed in tropical America. A tree of 5–8 meters, the crown broad and depressed, the pubescence of stellate hairs; leaves almost sessile, lance-oblong, very unequal at the base and 3-nerved, acuminate, dentate; flowers white, solitary in the leaf axils, the pedicels elongate; petals 1 cm. long; berry globose, red or yellow, 1 cm. in diameter, with very numerous small seeds. The intensely sweet fruit is eaten by children. The bark contains a strong fiber used in some regions for making twine. In Panama the tree is called Pasito. Pittier reports as Indian names: Tebe-krá (Brunka) and Duis-kap-kuo-gró (Térraba). The flowers are handsome and rather showy.

SLOANEA L.

Trees with broad, petiolate leaves; flowers large or small, apetalous, in axillary racemes or corymbs; sepals 4–7, narrow; stamens indefinite, the filaments very short, the anthers elongate; fruit a woody, 4–5-celled capsule, densely spiny or setose, the cells with 1–3 seeds.—Other species are known from Central America.

Sloanea Brenesii Standl., sp. nov.—Arbor, ramulis subgracilibus dense foliatis obtuse subangulatis tomentulosis et sparse hirsutis, novellis plus minusve compressis; folia inter minora breviter petiolata subcoriacea, petiolo crasso 4–8 mm. longo sordide tomentuloso et sparse hirsuto; lamina oblongo-obovata vel anguste elliptico-obovata 5–9 cm. longa 2.5–6.5 cm. lata, apice obtusa, acutata vel late rotundata et interdum emarginata, basin versus paullo angustata, basi ipsa obtusa vel acuta, supra ad nervos hirtella, aliter glabra, costa nervisque impressis, venulis obsoletis, subtus paullo pallidior ubique breviter hirtella, interdum molliter pubescens, costa gracili elevata, nervis lateralibus utroque latere circiter 9 arcuato-adscendentibus elevatis marginem attingentibus, venulis prominulis laxe reticulatis, margine undulato; flores axillares breviter racemosi, racemis paucifloris vix ultra 2 cm. longis, pedicellis usque 6 mm. longis breviter pilosis; sepala ovalia vel late ovata obtusa vel acutiuscula extus subdense puberula vel glabrata, intus dense sericea; stamina circiter 30 dense breviter pilosa sepalis vix longiora; capsula echinis inclusis 1.5 cm. vel paullo ultra diam., echinis gracilibus rigidis dense antrorso-barbellatis.—La Palma de San Ramón, September, 1928, *Brenes 6334* (type in Herb. Field Mus.). Entre San Ramón y La Palma de San Ramón, *Brenes 6178*.

Sloanea faginea Standl. Journ. Wash. Acad. Sci. 15: 478. 1925. Peralta, *Stork 482*. Collected also at El Muñeco; Navarro, at 1,400 meters. Endemic. A tall tree; petioles 1.5–3.5 cm. long; blades obovate, 12–21 cm. long, almost glabrous; flowers in axillary racemes; capsule 2.5 cm. long.

Sloanea guapilensis Standl. Journ. Wash. Acad. Sci. 15: 478. 1925. Forest near Guápiles, 500 meters, *Standley 37352*. Known only from the original collection. A tree of 6 meters; petioles 1–2 cm. long; blades obovate-oblong, 12–17 cm. long, almost glabrous; capsule 2 cm. long, the setae 1.5–2 cm. long.

Sloanea macropoda Standl. Journ. Wash. Acad. Sci. 15: 478. 1925. *Abrojo, Achotillo*. Forests of Boca Culebra, Pacific coast,

50 meters, *Pittier 12168*. Also in Guanacaste and Cantón de Dota, 600–1,600 meters. Endemic. A tree of 6–12 meters; petioles 5–11 cm. long; blades oblong-elliptic or obovate, about 30 cm. long, almost glabrous; racemes 15–22 cm. long; capsule 2.5–3 cm. long, reddish, the spines 2–2.5 cm. long. The original collection was reported under the name *S. macrophylla* Spruce, a South American species.

Sloanea medusula Schum. & Pitt. Repert. Sp. Nov. 13: 312. 1914. *Mano de león.* Río Hondo, Llanuras de Santa Clara, *Pittier 16141*. Known only from the original collection. A tall tree; petioles 15 cm. long; blades ovate, 55 cm. long, pale beneath and densely tomentulose; flowers in racemes 10–15 cm. long; sepals 9 mm. long.

Sloanea megaphylla Pittier. Río Changuinola. Also in Panama. A tall tree; leaves short-petiolate, oval, somewhat stellate-pubescent beneath, the veins elevated and very prominent, the base cordate. Known in Panama by the name Mameicillo colorado. The wood is used in some places for construction.

Sloanea palmana Standl., sp. nov.—Arbor, ramulis crassis obtuse angulatis vel subteretibus minute sparse brunneo-tomentulosis vel glabratis, internodiis brevibus vel elongatis; folia majuscula breviter petiolata tenuiter coriacea, petiolo crassiusculo 1.5–2 cm. longo tomentuloso vel glabrato; lamina ovali-obovata vel obovata 12–22 cm. longa 6.5–11 cm. lata, apice rotundata vel obtusissima et saepius abrupte obtuso-apiculata, basin versus paullo angustata, basi ipsa cuneato-obtusa, supra in sicco fusco-brunnescens glabra vel tantum ad costam vix impressam sparse hirtella, venulis obsoletis, subtus obscure brunnescens in statu juvenili ad nervos minute puberula cito glabrata, costa crassa elevata, nervis lateralibus utroque latere circiter 9 angulo semirecto adscendentibus elevatis paullo arcuatis juxta marginem arcuato-conjunctis, venulis prominulis laxe reticulatis; inflorescentiae axillares racemosae breviter pedunculatae circiter 5 cm. longae atque 8-florae, pedicellis gracilibus 1.5–2.5 cm. longis dense sordido-hirtellis; sepala oblongo-lanceolata 4–5 mm. longa anguste longiattenuata extus dense minute tomentulosa intus dense sericea; stamina numerosissima sepalis vix longiora dense breviter pubescentia; ovarium ovoideum densissime adpresse ochraceo-pilosum in stylum 4 mm. longum dense adpresso-pilosum sensim attenuatum.—La Palma de San Ramón, 1,250 meters, March, 1929, *Brenes 6786* (type in Herb. Field Mus.).

Sloanea quadrivalvis Seem. *Terciopelo.* Common in open forest of the Pacific tierra caliente. Panama to Mexico. A medium-sized tree with a short trunk, the crown rounded; leaves oblong to obovate, 5–10 cm. long, obtuse or rounded at the apex; flowers chocolate-colored, in 3-flowered corymbs; capsule 1.5 cm. long, with a dense, velvety, purple covering. The setae of the capsules are easily separated from the fruit, and are a great menace to the eyes. They also penetrate the skin easily, and cause intense itching.

TRIUMFETTA L.

Pubescent shrubs or trees; leaves petiolate, broad, dentate; flowers small, yellow, axillary or opposite the leaves, usually paniculate, with or without petals; stamens few or numerous; ovary 2–5-celled; fruit bur-like, a small, globose capsule, commonly indehiscent, covered with hard, rigid spines.—Other species are found in Central America. The burs adhere closely to clothing and to fur of animals. The stems contain a strong fiber. In Panama these plants are known commonly by the name Cadillo.

Triumfetta Calderoni Standl. Forests of Guanacaste; region of San Ramón. Also in Salvador and Guatemala. A tree of 7.5 meters; leaves large, pale beneath and covered with a fine tomentum of stellate hairs; flowers with petals; spines of the fruit covered with soft, spreading hairs.

Triumfetta Lappula L. *Mozote, Mozote de caballo.* Abundant in thickets of the tierra caliente. A species of wide distribution. A shrub of 1–2.5 meters, the leaves often lobate, softly pubescent; flowers without petals, the sepals 3–4 mm. long; spines of the fruit covered with minute, retrose barbs.

Triumfetta semitriloba Jacq. *Mozote, Mozote de caballo. T. josefina* Polak. Linnaea 41: 552. 1857 (San José, *Polakowsky 523;* I have seen a photograph of the type). Abundant in thickets throughout the central region, 800–1,800 meters, also in the tierra caliente. A species of wide distribution. A shrub of 1–2 meters; leaves broad or narrow, often lobate, green, stellate-pubescent; flowers with yellow petals, the sepals 5–6 mm. long; spines of the fruit covered with short, retrorse barbs. The leaves and bark of this and other species contain a sweet mucilage which is slightly acid, and an infusion of them is employed as a remedy for colds. The plants are employed also for clarifying sirup in making cane sugar.

MALVACEAE. Mallow Family

Herbs, shrubs, or small trees, the pubescence mostly of stellate hairs; leaves alternate, simple, often lobate, with stipules; flowers small or large, with 5 sepals that are more or less united and 5 colored petals; stamens numerous, united to form a column; fruit generally dry and composed of few or numerous carpels containing 1 or more seeds, arranged like the sections of an orange, the fruit in some genera capsular or fleshy.—A few additional genera are represented in Central America. Most of the plants contain a strong fiber and mucilaginous sap.

ABUTILON Mill.

Herbs or shrubs; leaves broad, with long petioles, sometimes angled or lobate; flowers axillary; involucre none at the base of the flower; fruit with 5 or more numerous carpels, each with 2 or more seeds.—Other species are known from Central America.

Abutilon Brenesii Standl., sp. nov.—Frutex 2–3-metralis, ramulis subteretibus viridibus dense minute stellato-pubescentibus, internodiis elongatis; folia majuscula longipetiolata membranacea, petiolo gracili 7–11 cm. longo et ultra pubescentia subadpressa pallida stellata dense induto; lamina late ovato-cordata circiter 21 cm. longa et 17 cm. lata vel minor, acuminata vel longiacuminata, basi profunde cordata, sinu lato aperto, in toto margine grosse crenata, supra viridis asperula sparse ad nervos densius pilis minutis stellatis conspersa, subtus fere concolor dense pilis parvis non intertextis stellato-pilosula, basi 7–9-nervia, venis conspicuis laxe reticulatis; flores magni axillares vel apice rami subracemosi, foliis floralibus ceteris multo minoribus, pedunculo in statu fructifero ad 5.5 cm. longo, in anthesi 1–3.5 cm. longo dense minute fulvo-stellato-tomentoso; calyx late campanulatus teres basi late rotundatus 1.5–2 cm. longus extus dense pilis stellatis fulvo-tomentosus, ad medium lobatus, lobis late ovatis abrupte apiculato-acuminatis 3-nerviis; petala 3 cm. longa lutea; fructus 2 cm. longus, carpellis circiter 7 densissime stellato-tomentosis apice obtusis vel acutiusculis, ovulis numerosis.—Río Jesús de San Ramón, 850 meters, *Brenes 3587* (type in Herb. Field Mus.).

Abutilon giganteum (Jacq.) Sweet. Vicinity of San José and Santa María de Dota, 1,100–1,700 meters, in thickets or hedges. A species of wide distribution. A shrub of 1.5–2.5 meters, the abundant pubescence of fine, stellate hairs; leaves large, cordate, crenate, narrow-acuminate; flowers yellow, 1 cm. long; carpels 10–15 mm.

long, acute, pubescent. Costa Rican specimens are of two forms, one with branches covered with long, soft, spreading hairs, the other with finely stellate-tomentose branches, but I believe that they do not represent distinct species.

Abutilon hirtum (L.) Sweet. Dry thickets of Guanacaste. Widely distributed in tropical America. Plants herbaceous or suffrutescent, a meter high, the branches tomentose and hirsute; leaves broad, cordate, crenate; flowers yellow; carpels of the fruit very numerous, rounded at the apex, 1.5 cm. long.

Abutilon insigne Planch. *Farolillo, Farolito, Farol chino, Coronita.* An ornamental plant of gardens, native of South America. A shrub of 1–3 meters; leaves green, cordate; petals red.

Abutilon megapotamicum (Spreng.) St. Hil. & Naud. Cultivated as an ornamental plant. Native of South America. A slender shrub, the leaves narrowly triangular-lanceolate, serrate; flowers narrow, the calyx angulate.

Abutilon pictum (Gill.) Walp. *Farolillo. A. striatum* Dicks. An ornamental garden plant. Of American origin, but probably unknown in a wild state. A small shrub, the leaves almost glabrous, deeply 3–5-lobate, the lobes narrow-acuminate, serrate; flowers campanulate, orange, the veins of the petals red or purple.

Abutilon umbellatum (L.) Sweet. Reported for the region of Boruca. A species of wide distribution. An herb or shrub a meter high or less; leaves broad, somewhat cordate, soft-pubescent, acute, crenate; flowers 1 cm. long; carpels of the fruit only 5, acute, 7 mm. long. It may well be that the single collection cited for Costa Rica belongs to some other species of the genus.

ALTHAEA L. Hollyhock

Althaea rosea (L.) Cav. *Mírame-lindo.* Cultivated in gardens as an ornamental plant, at least in the temperate regions. Originally from China. A tall, simple-stemmed herb with very large, showy flowers in various colors, and either single or double. Called Vara de San José and Malva real in some regions of Central America.

ANODA Cav.

One other species occurs in Central America.

Anoda cristata (L.) Schlecht. Fields and cultivated ground, abundant in many places, Meseta Central to the Pacific coast.

Widely dispersed in tropical and subtropical America. An annual herb, less than a meter high, branched, pilose; petioles elongate, the leaf blades hastate; flowers large, blue, long-pedunculate; carpels of the fruit 9–15, shorter than the sepals, 1-seeded. A showy plant because of its large and brightly colored flowers. The Costa Rican plant has been referred to *A. acerifolia* DC. and *A. hastata* Cav.

It is probable that *Gayoides crispum* (L.) Small occurs in Costa Rica, since it is common in the drier parts of Central America, but I have seen no Costa Rican specimens. It is a prostrate herb, much like some species of *Abutilon*.

GOSSYPIUM L. Cotton

The taxonomy of this important genus of plants is so confused that at present one is unable to make definite statements regarding the species native or cultivated in Costa Rica. The fact is that there is little or no certainty regarding the names to be used for the most commonly cultivated species of America. The most of these are of American origin, plants cultivated for their fiber long before the conquest. There are also species native of the Old World, and these are sometimes grown in America. About the cottons of Costa Rica one can do no better than quote Pittier: "The tree cotton, of which there are two species or forms, *G. peruvianum* Cav. or kidney cotton, and *G. acuminatum* Roxb., with seeds free from the lint, is probably indigenous in tropical America, where the native people maintained it in a semicultivated state about their dwellings, in two varieties, one white, which was the more common, the other brown, known today in Costa Rica as algodón tocolote. The cheapness of imported cotton goods has destroyed the cultivation of cotton in Costa Rica, as well as the interesting industries based upon it by the Indians. The annual cottons (*G. hirsutum* L. and *G. barbadense* L.) produce well in the region, and could be grown upon a large scale, if it were not for the pests that attack them so persistently that every attempt at their cultivation has resulted in failure." Among Indian names reported for the various species are the following: Dekuo (Cabécara): Tsebuk-kra (Brunka); Shkui-sho (Térraba); Chebo (Boruca); Zuji (Guatuso).

Gossypium mexicanum Todaro. *Algodón.* A rather shrubby plant, common in a wild state in many parts of the country. It grows almost always about dwellings, and does not have the appearance of a native plant, but probably was introduced from the

North centuries ago. It is plentiful in almost all regions of Central America, as well as in many parts of Mexico, and is probably the species most used in ancient times.

HIBISCUS L.

Reference: Hochreutiner, Ann. Cons. Jard. Genève 4: 22. 1900.

Herbs, shrubs, or small trees, the leaves dentate or lobate; flowers usually large and showy, commonly campanulate; calyx subtended by an involucre of bracts; ovary 5-celled, the cells with 3 or more ovules; fruit a 5-valvate capsule.—Other species grow in Central America.

Hibiscus Abelmoschus L. Atlantic coast, in thickets or abandoned ground. Native of the East Indies. A tall herb, covered with stiff, spreading hairs; leaves deeply lobate, the lobes narrow; corolla bright yellow, 8–10 cm. long; calyx deciduous; capsule large, pilose, the seeds glabrous. The large flowers are very pretty, of a handsome shade of yellow, and the plant is sometimes grown for ornament, as well as for its seeds, which have the odor of musk (almizcle). In other parts of Central America the species is known by the names Algalía and Almizcle.

Hibiscus cannabina L. *Avispón.* Sometimes grown in gardens for ornament; naturalized at Limón. Native of the East Indies. A low, annual plant, the leaves somewhat pilose, more or less lobate; bractlets bifurcate at the apex; petals dark red, 2 cm. long.

Hibiscus diversifolius Jacq. Known in Costa Rica only from Cartago, at 1,250 meters. Also in British Honduras and northern South America, and in the Old World tropics. A tall herb, covered with short prickles; leaves somewhat lobate, dentate; flowers large, sessile, the bractlets not bifurcate at the apex.

Hibiscus esculentus L. The okra is sometimes cultivated, especially by Jamaicans of the Atlantic coast, for its edible capsules. Native of the Old World tropics. Known in Central America by the names Ocra, Ñajú (Panama), and Gombo. The tender young fruits are utilized in various ways, most often in soups.

Hibiscus furcellatus Lam. Reported for the region of Buenos Aires. Widely distributed in tropical America. A tall herb, sparsely stellate-pubescent; leaves broad, acuminate, not lobate; bractlets bifurcate at the apex; flowers very large, pink.

Hibiscus Manihot L. *Tres de la tarde.* Sometimes planted for ornament in gardens of the Meseta Central. Native of the Old World tropics. A tall, coarse herb, the leaves almost glabrous, deeply lobate, the lobes 3–5 or more numerous, acute or acuminate, coarsely crenate-lobulate; flowers very large, yellow, the throat red; bracts about 5, hispidulous or glabrate, broad, obtuse or acute; calyx spathaceous, cleft on one side in anthesis.

Hibiscus mutabilis L. Planted commonly for ornament. Of Asiatic origin. A shrub, the leaves stellate-pubescent, shallowly lobate; flowers large, red, becoming white as they wither.

Hibiscus Rosa-sinensis L. *Clavelón.* One of the most common ornamental shrubs of gardens. Native of China. A shrub with large and very handsome, showy flowers, extremely variable in color, and often double. The Chinese hibiscus is one of the most popular ornamental plants of most tropical regions, and often is planted to excess. Names in use for it in Central America are Amapola, Mar Pacífico, and Clavel.

Hibiscus Sabdariffa L. Planted, especially in the coasts. Native of the East Indies. A pilose, branched herb or shrub, the branches dark red; leaves deeply lobate, the lobes narrow and elongate; flowers large, yellowish white, the center dark red; calyx accrescent, red, fleshy. The calyces and capsules contain an abundant, mucilaginous sap of acidulous and agreeable flavor. They are used for the preparation of refreshing drinks and of jellies. In Panama this plant is called Viñuela, and in Honduras Rosa de Jamaica. The usual English name is Roselle.

Hibiscus schizopetalus (Mart.) Hook. A common ornamental shrub of gardens. Native of Africa. Similar in most characters to *R. Rosa-sinensis*, but the flowers pendent, their petals deeply laciniate. Known in other parts of Central America as Clavel, Clavel de canastilla, Avispilla, and Paragüita china.

Hibiscus sororius L. f. Swampy places of the Atlantic coast. Widely distributed in tropical America. A tall herb, finely stellate-pubescent; leaves cordate, not lobate; flowers large, pink or white, the bractlets dilated and broad at the apex.

Hibiscus tiliaceus L. *Majagua.* Abundant in coastal thickets, and along estuaries of both coasts. Pantropic in distribution. A shrub or tree of 6 meters or less; leaves rounded-cordate, almost

entire, whitish and tomentose beneath; flowers yellow, 5–7 cm. long, very showy. The wood is white or somewhat purplish, soft and weak, but fairly solid, easy to work, and durable. The bark yields a fine, strong fiber used in many regions for making rope and twine. The leaves are employed in domestic medicine as an emollient. Indian names reported by Pittier are: son Stsa (Bribrí); Krókua (Brunka); Kipkuó, Trokró (Térraba).

MALACHRA L.

Three or four species are known from Central America, and others probably occur in Costa Rica.

Malachra alceifolia Jacq. Dry thickets of Guanacaste. Widely distributed in tropical America. An erect, stout, hispid, branched herb; leaves petiolate, ovate or rounded, not lobate, dentate; flowers small, yellow, in small heads subtended by large, concave, cordate bracts; fruit of 5 obtuse carpels.

Malachra fasciata Jacq. Santiago de San Ramón, collected by Brenes, and doubtless in many other regions. Widely dispersed in tropical America. Rather similar to the preceding species, but the leaves more or less lobed, often deeply so, and the petals white.

MALVA L. Mallow

Malva parviflora L. *Malva.* Common in pastures and cultivated ground of the Meseta Central. Native of Europe. Annual or biennial, erect or procumbent; leaves rounded, shallowly lobate, somewhat pubescent, long-petiolate; flowers small, pink; petals 5 mm. long; fruit composed of about 10 small carpels.

MALVASTRUM Gray

Erect herbs, the leaves petiolate, dentate; flowers small, solitary or fasciculate; involucre of few small bractlets, or none; carpels of the fruit small, 1-seeded.—Other species are known from Central America.

Malvastrum coromandelianum (L.) Garcke. *M. tricuspidatum* Gray. Dry thickets of the Pacific coast. Almost pantropic in distribution. Plants strigose; leaves ovate or oblong, obtuse, not lobate; flowers solitary in the leaf axils, the petals pale yellow; carpels 8–12. The plant has the general appearance of a species of *Sida.*

Malvastrum mexicanum (Schauer) Hemsl. Known in Costa Rica only from the region of El Copey, where it grows along roadsides, but is not common. Also in Mexico. Leaves broad, lobate, densely stellate-pubescent; flowers small, white, fasciculate in the leaf axils.

Malvastrum spicatum (L.) Gray. Dry thickets of the Pacific coast. Almost pantropic in distribution. A stellate-pubescent herb; leaves ovate, acute or acuminate, not lobate; flowers yellow, in dense, terminal spikes.

MALVAVISCUS Cav.

Shrubs or small trees; leaves narrow or broad, 3–5-nerved, dentate and often lobate; flowers solitary or fasciculate, large, the corolla narrow, its petals much imbricate; calyx subtended by an involucre of numerous narrow bractlets; fruit fleshy, red or yellow at maturity, mucilaginous.—Other species are known from Central America. It is difficult to decide what species should be recognized, since they are separated by unstable characters.

Malvaviscus arboreus Cav. *Amapola, Mapola, Quesito.* Abundant in forest and thickets of the temperate and hot regions, ascending to 2,100 meters. Widely distributed in tropical America. Often grown as an ornamental plant in hothouses of Europe and the United States. A shrub of 1.5–3.5 meters; leaves variable in shape and pubescence, lance-oblong to rounded, dentate, often lobate, usually covered beneath with a dense coat of stellate hairs, rounded or cordate at the base; peduncles 1-flowered, short or elongate; bractlets linear; corolla red, 3–4.5 cm. long. The Costa Rican specimens exhibit several recognizable forms, but these are scarcely to be considered as species. It is possible that at some later time it may be practical to recognize a greater number of species in Costa Rica, but I am inclined to believe that the contrary is more probable. The fruits are edible but not appetizing. A decoction of the leaves is employed as a remedy for stomach affections, and has other applications in domestic medicine. It is probable that *M. brevipes* Benth. (Bot. Voy. Sulph. 68. 1844; type from Nicoya) is only a form of *M. arboreus.*

Malvaviscus palmanus Pittier & Donn. Sm. Bot. Gaz. 23: 238. 1897. *Amapola, Amapolilla.* Forests of La Palma de San José, 1,700 meters, *Tonduz 9712.* Frequent in forests of the central region; also about San Ramón, and in Guanacaste; at 750–1,800

meters. Endemic. A shrub or small tree of 1.5–6 meters; leaves ovate or ovate-oblong, acuminate, entire or nearly so, 3-nerved, very minutely pubescent above, almost glabrous beneath; flowers about 4 cm. long.

Malvaviscus penduliflorus DC. *Amapola.* Forests and hedges of the central region, 1,100–1,650 meters. Ranging to Mexico. Similar to *M. arboreus*, but the leaves very sparsely pubescent or almost glabrous, small, oblong-lanceolate to ovate, dentate, not lobate. Probably, at least as to the Costa Rican specimens, a mere form of *M. arboreus*.

Malvaviscus spathulatus Garcke. *Mapola.* Common in forests of the Atlantic tierra caliente. A shrub of 1.5–3.5 meters, the pubescence short and fine; leaves very broad, large, somewhat lobate or not lobate, sparsely or sometimes densely pubescent, cordate at the base; peduncles much elongate, usually longer than the petioles. This species was based upon cultivated plants believed to be of Mexican origin. I have determined the Costa Rican specimens by comparison with a photograph of a specimen in the Berlin herbarium, collected at Turrialba by Oersted, and determined by Garcke himself. It is rather probable that the species is not Mexican but rather endemic in Costa Rica.

PAVONIA Cav.

Herbs or shrubs; leaves broad or narrow, dentate or entire, sometimes lobate; flowers small or large, axillary and solitary, paniculate, or clustered at the apex of a peduncle; involucre of 5 or more bractlets; fruit usually dry, the carpels 1-seeded, sometimes armed with spines.—Other species grow in Central America.

Pavonia dasypetala Turcz. *Majagüita.* Common in forests of the Pacific slope, ascending to 1,100 meters. Ranging to South America. A shrub of 1–3 meters, softly pubescent; leaves large, long-petiolate, crenate, cordate at the base; bractlets numerous; petals pink, 4–6 cm. long; fruit somewhat fleshy and mucilaginous. The bark contains a strong fiber, which was used by the Indians. The flowers are handsome and showy. Pittier reports the Térraba name of Kutshi-tshi-gró.

Pavonia fruticosa (Mill.) Fawc. & Rendle. *P. Typhalaea* Cav. Thickets of the tierra caliente. Widely distributed in tropical America. An erect herb; leaves petiolate, pubescent, obovate-

oblong, acute, dentate; flowers small, white; bractlets 5 or 6, ovate or lanceolate; carpels each bearing 3 spines.

Pavonia guanacastensis Standl., sp. nov.—Herba elata ramosa, ramis gracilibus subteretibus dense pilis longis patentibus albidis laxis hirsutis, pilis aliis brevioribus viscidis intermixtis, internodiis brevibus; stipulae filiformes 4 mm. longae et ultra; folia parva longipetiolata membranacea, petiolo gracili 1–2.5 cm. longo hirsuto; lamina ambitu ovato-rotundata circiter 3.5 cm. longa et aequilata plus minusve angulata acuta, basi profunde anguste cordata, arcte crenato-serrata, lobis posticis rotundatis vel acutiusculis, supra subdense pilis longis albidis hirsuta, pilis paucis brevibus stellatis intermixtis, subtus paullo pallidior breviter hirsuta et sparse stellato-hispidula, basi 7–9-nervia; flores pauci ex axillis superioribus nascentes solitarii, pedunculo 1.5–4 cm. longo dense pilis patentibus simplicibus viscido-piloso; bracteolae circiter 16 filiformes ca. 2 cm. longae distinctae dense pilis longissimis patentibus pallidis pilosae; calyx longipilosus pallidus ca. 1 cm. longus fere ad basin lobatus, lobis ovato-lanceolatis longiacuminatis; petala 2 cm. longa ut videtur lutea, basi atropurpurea, glabra venosa; carpella fructus 5 glabra vix 5 mm. longa apice obtusa vel subemarginata, dorso unicostata et elevato-venulosa.—Open potrero, northeast of Liberia, 50 meters, January 13, 1930, *C. W. Dodge 6217* (type in Herb. Field Mus.). Between Liberia and Guachipelín, May, 1932, *Brenes 15505*.

Pavonia longipes Standl., sp. nov.—Herbacea vel fruticosa metralis, ramis viridibus sparse minute stellato-pubescentibus vel fere glabris; stipulae lineares ca. 1. cm. longae; folia magna petiolata membranacea, petiolo 1.5–6 cm. longo; lamina obovato-oblonga 20–24 cm. longa 7–9 cm. lata acuminata basin versus sensim angustata arcte supra medium sinuato-serrata, supra glabra, subtus pallidior parcissime adpresse stellato-pubescens vel fere omnino glabra; pedunculi axillares longissimi usque ad 35 cm. longi capitulis 1 vel 2 dense paucifloris terminati, floribus sessilibus vel breviter pedicellatis, bracteis parvis trilobis; bracteolae ca. 8 ad medium connatae, lobis anguste lanceolatis acuminatis, sparse adpresse stellato-pubescentes, calyce duplo longiores, in statu fructifero 7–8 mm. longae; petala purpurea; carpella 5 angusta 7 mm. longa glabra dorso unicostata lateribus laevibus planis, apice 3-aristata, aristis 5 mm. longis retrorse scabris.—Changuinola Valley, Panama, *V. C. Dunlap 408* (type in Herb. Field Mus.); Finca Montecristo, near El Cairo, Prov. Limón, Costa Rica, *Standley & Valerio 48565*.—In

general appearance similar to *P. rosea*, which has more abundant pubescence, shorter peduncles, and a very different involucre.

Pavonia Maxonii Standl. Regions of Orosi and Santa María de Dota, in moist forest. Also in Panama. An herb or shrub a meter high; leaves short-petiolate, oblanceolate-oblong, acuminate, coarsely dentate with very unequal teeth, stellate-pilose; peduncles elongate, few-flowered or often 1-flowered, the bracts 3-lobate; bractlets numerous, linear; petals red; carpels with 3 spines at the apex. Similar to *P. rosea*, which differs in having entire bracts.

Pavonia oxyphyllaria Donn. Smith, Bot. Gaz. 23: 237. 1897. *P. costaricensis* Hochr. Ann. Cons. Jard. Bot. Genève 10: 18. 1907 (Cerros de Zent, *Tonduz 14863*); *Malache fulva* Standl. Contr. U. S. Nat. Herb. 18: 115. 1916 (Hacienda de Chirripó, *Pittier 16080*); *P. fulva* Standl. Field Mus. Bot. 4: 231. 1929. Forests of Río Naranjo, 200–250 meters, *Tonduz 7697*. Forests of the Atlantic tierra caliente. Endemic. An herb or shrub a meter high, densely hirsute, the hairs brown; leaves almost sessile, lance-oblong, acute, serrate; peduncles axillary, 1-flowered, elongate; bractlets numerous, linear, twice as long as the calyx; carpels with 3 spines at the apex.

Pavonia paniculata Cav. *P. corymbosa* Willd. Forests and thickets of the tierra caliente, ascending to the Meseta Central. Mexico to South America. An herb or shrub of 1–2 meters, branched, finely pubescent; leaves petiolate, ovate, cordate at the base, acute, crenate; flowers paniculate, yellow, the petals 1.5 cm. long; bractlets numerous, linear.

Pavonia rosea Schlecht. Abundant in thickets and hedges, Meseta Central to the coasts. Widely distributed in tropical America. An erect herb, sometimes a shrub of 1.5 meters, finely stellate-pubescent; leaves petiolate, obovate-oblong, acute, finely crenate; peduncles short or elongate, usually several-flowered; bractlets 8–12, linear; petals pink; carpels with 3 spines at the apex. One of the most common plants of the tierra caliente of Central America. The carpels adhere to clothing by means of their barbed spines, which penetrate the flesh easily.

Pavonia sessiliflora HBK. Thickets of the Pacific slope. Ranging to Brazil. An herb or shrub, finely pubescent; leaves ovate, obtuse, palmately nerved, dentate; peduncles elongate, the flower heads subtended by large, foliaceous, cordate bracts; petals yellow; carpels without spines.

Pavonia spicata Cav. Thickets along the Atlantic beaches. Widely distributed in tropical America. A shrub of 1.5–2.5 meters; petioles elongate, the leaf blades cordate, almost glabrous and entire, narrow-acuminate; flowers in elongate racemes, the bractlets linear; petals 2 cm. long, whitish green; carpels unarmed.

ROBINSONELLA Rose & Baker

There are three species in Central America, the other members of the genus being Mexican.

Robinsonella divergens Baker & Rose, Gard. & For. 10: 245. 1897. San José, *J. D. Smith 4751*. Common in thickets about San José, also at San Rafael; San Ramón. Extending to Guatemala. A shrub or tree of 3–9 meters; leaves large, long-petiolate, lobate, the pubescence fine and stellate; flowers paniculate, white; carpels numerous, membranaceous. An ornamental and exceptionally handsome tree because of the abundant, large, white flowers.

SIDA L.

Herbs or shrubs, the leaves petiolate, dentate; flowers small, not involucrate, commonly white or yellow; carpels of the fruit few or numerous, 1-seeded.—Other species occur in Central America and probably also in Costa Rica.

Sida acuta Burmann. *Escobilla, Escobilla negra. S. Garckeana* Polak. Linnaea 41: 551. 1877 (near Cartago, *Polakowsky 433*). Abundant throughout the tierra caliente, especially about dwellings. Pantropic in distribution. An erect herb, pubescent or almost glabrous; leaves green, short-petiolate, lanceolate to ovate, distichous, acute, serrate; flowers short-pedicellate, axillary, the calyx angulate; petals white or yellow; carpels 7–12, short-rostrate. One of the most abundant weeds of the Central American tierra caliente, almost always growing profusely about dwellings.

Sida aggregata Presl. East of Las Cañas, Guanacaste, 60 meters, *Dodge 6379*. Panama to Mexico; reported from Jamaica and Venezuela. A slender shrub, the branches minutely stellate-tomentose; leaves long-petiolate, broadly rounded-cordate, 5–12 cm. long, acute or abruptly acuminate, deeply cordate at the base, crenate, green above, minutely stellate-pubescent beneath; flowers small, in very large panicles, the inflorescence densely viscid-pilose; calyx terete, densely pilose with long, soft hairs; fruit of usually 5 carpels.

Sida decumbens St. Hil. & Naud. Common in thickets and pastures, Meseta Central to the Atlantic coast; region of San Ramón. Mexico to Brazil. A slender herb, the stems procumbent; leaves cordate, very unequal at the base, acute, crenate, somewhat hirsute; flowers axillary, terminating long pedicels, the petals pale yellow; carpels 5, not rostrate.

Sida glabra Mill. *S. ulmifolia* Cav. An erect herb, pilose but not viscid; leaves ovate or lanceolate, cordate at the base, crenate, narrow-acuminate; flowers pedicellate; carpels 5, not rostrate. This species is reported for various parts of the Meseta Central and tierra caliente, but most of the records pertain to the last preceding species, and it is not certain that *S. glabra* grows in Costa Rica, although it is frequent in some parts of Central America.

Sida glomerata Cav. Carrillos de Poás, *Brenes 17385*, and doubtless elsewhere on the Pacific slope. Widely distributed in tropical America. Similar in appearance to *S. acuta*, the leaves distichous, green on both surfaces, the whole plant more or less hirsute; stipules broad, foliaceous 5-nerved (3-nerved in *S. acuta*); carpels of the fruit 5.

Sida glutinosa Commerson. In pastures and thickets, Meseta Central to the Pacific coast. Widely distributed in tropical America. An erect or ascending herb, less than a meter high, viscid-pilose; leaves ovate-cordate, acuminate, crenate; flowers pedicellate, sometimes paniculate, white; carpels 5, not rostrate.

Sida linifolia Juss. San Mateo, and doubtless in other localities; a plant of savannas and pastures. Mexico to South America and Africa. An erect, pubescent herb; leaves linear, entire, petiolate; flowers pedicellate, in short racemes or in corymbs terminating an elongate peduncle; calyx not angulate; petals white or yellowish; carpels about 7, not rostrate.

Sida pyramidata Desp. Common in thickets and open forest of the Pacific tierra caliente; region of San Ramón. Mexico to Colombia. A branched herb or shrub of 1–1.5 meters, the pubescence of minute, pale, stellate hairs; leaves long-petiolate, broadly cordate, acuminate, crenate; flowers small, pale yellow, short-pedicellate, paniculate; calyx not angulate; carpels about 7, not rostrate.

Sida rhombifolia L. *Escobilla.* Abundant almost everywhere from the Meseta Central to the coasts, but not growing, as a rule, in forest. Pantropic in distribution. An herb or shrub, usually less

than a meter high, branched; leaves short-petiolate, oblong to ovate, obtuse or acute, serrate, pale stellate-tomentulose beneath; flowers axillary, pedicellate, yellow; carpels 7 or more, short-rostrate. One of the most abundant weeds about dwellings, and especially plentiful in pastures. Cattle are fond of the plant, although it is believed to be a poor forage plant. Places in which it is most abundant, especially cattle pastures, are to be avoided, since too often they are heavily infested with ticks (garrapatas). Like other Malvaceae, this plant has emollient properties, and its root is employed in the treatment of infantile diarrhea. It is perhaps the most plentiful and most generally dispersed plant of all Central America. Pittier reports the Térraba name of Kuarsho. The name Escobilla ("little broom," in reference to the frequent use of the branches for making rough brooms) is given in Central America to many species of *Sida* and *Malvastrum*.

Sida savannarum Schum. Reported only from Buenos Aires. Extending to British Guiana. An erect herb, densely stellate-pubescent; leaves petiolate, ovate-cordate, acuminate, pale, serrate; flowers almost sessile, fasciculate; calyx angulate; carpels 5, short-rostrate.

Sida spinosa L. Pacific tierra caliente. Widely distributed in tropical America. An erect herb, less than a meter high; leaves oblong to ovate, short-petiolate, truncate at the base, crenate; flowers axillary, short-pedicellate, yellow, the calyx angulate; carpels 5, rostrate.

Sida urens L. Common in thickets and pastures of the central region, extending to the coasts, ascending to 1,600 meters; San Ramón. Widely distributed in tropical America. An erect or somewhat scandent herb, sometimes as much as 2 meters long, hirsute; leaves ovate-cordate, acuminate, serrate; flowers sessile, densely clustered and usually forming terminal spikes; corolla yellow or orange, the center dark red; carpels 5, not rostrate.

URENA L.

Urena lobata L. Reported from Cocos Island, and to be expected on the mainland. Widely distributed in tropical regions. Similar to the following species, but the leaves merely angulate or serrate, not lobate.

Urena sinuata L. Boruca, growing about dwellings. A species of wide distribution. A stellate-pubescent herb or shrub; leaves

petiolate, deeply lobate and dentate; flowers small, axillary, pink; fruit dry, 5-celled, densely covered with short, hard, barbate spines.

WERCKLEA Pittier & Standl.

Small or medium-sized trees; leaves long-petiolate, broad, entire or undulate, palmately nerved, the pubescence of short, stellate hairs; flowers large, solitary in the leaf axils; involucre shortly trilobate; fruit an oblong capsule, 5-angulate.—An endemic genus, composed of only two species. Dedicated to Carlos Wercklé, genial, tireless, and enthusiastic explorer of the Costa Rican forests, a well informed student of the flora of his adopted land.

Wercklea insignis Pittier & Standl. Contr. U. S. Nat. Herb. 18: 112. 1918. *Panamá.* Forests near La Palma, Prov. San José, 1,450 meters, *Wercklé.* Plentiful in the region of La Palma and La Hondura de San José, where it grows along the old cart road and on the banks of mountain streams, sometimes forming small, pure stands; noted also at Las Nubes, on the slopes of Irazú, but there less abundant; also in the region of San Ramón. Endemic. A tree of 6–10 meters, the trunk 30–40 cm. in diameter; stipules foliaceous, rounded or oblong; leaves rounded-reniform, 15–40 cm. wide, green; involucre 1.5–2 cm. long; capsule 5 cm. long, hispid. A beautiful and ornamental tree, planted in gardens at San Francisco de Guadalupe, and perhaps elsewhere. It is one of the most interesting and showy trees of Costa Rica, and, abounding as it does along the old cart road to the Atlantic coast, in some places with its branches extending over the road so as to brush a traveler on horseback, it is hard to understand why it was not collected 50 years ago or more, for it must have been seen by most of the botanists who have visited Costa Rica.

Wercklea lutea Rolfe, Kew Bull. 118. 1921. *Burío extrangero.* Las Nubes, Río Cascajal, on the slopes of Irazú, 2,100 meters, *Lankester.* Abundant in forest about Las Nubes, and forming extensive and dense stands along small streams there; I saw the tree also at Yerba Buena, on the slopes of Barba, and at Santa María de Dota I saw a cultivated individual, said to have come from Naranjo. Endemic. A tree of 3–7.5 meters, similar to the preceding species, but the corolla yellow, 10–11 cm. long. Even showier than *W. insignis* because of the bright color of the flowers, which suggest pumpkin (ayote) blossoms. In form the flowers much resemble those of the hollyhock (*Althaea*).

WISSADULA Medic.

Erect herbs or shrubs, the pubescence of minute, stellate hairs; leaves petiolate, cordate, entire (in the Costa Rican species); flowers small, paniculate or solitary in the leaf axils, not involucrate; carpels 5, imperfectly 2-celled by constriction of their sides.—One or two additional species are known from Central America.

Wissadula amplissima (L.) Fries. Dry forests of Guanacaste. Widely distributed in tropical America. Plants suffrutescent, erect; leaves densely tomentose on both surfaces, narrow-acuminate; carpels 7 mm. long.

Wissadula costaricensis Standl., sp. nov.—Herba vel frutex 1–2.5 m. altus; folia longe petiolata membranacea, lamina ovato-cordata 4–13 cm. longa 2.5–8 cm. lata integra longe angusteque attenuato-acuminata, basi profunde cordata, supra in statu juvenili dense minutissime stellato-pubescente, serius glabrata, subtus densius stellato-tomentosa; flores axillares atque paniculati; calyx 5 mm. longus, lobis latissime ovatis acutiusculis stellato-tomentulosis; petala lutea 7–8 mm. longa; fructus 5-merus minutissime puberulus maturus nigrescens, carpidiis 11–12 mm. longis, 1–2 mm. longe rostratis.—Pasture near Santa María de Dota, Prov. San José, 1,500 meters, *Standley & Valerio 44156* (type in U. S. Nat. Herb.); Cerro de La Carpintera, 1,600 meters, *Standley 35508*. Closely related to the Brazilian *W. parviflora* (St. Hil.) Fries, but differing conspicuously by the simple hairs of the upper leaf surface. Distinguished from other Costa Rican species by its large carpels, 11–12 mm. long.

Wissadula excelsior (Cav.) Presl. Common in thickets of the tierra caliente, ascending to 900 meters. Widely distributed in tropical America. Plants suffrutescent, 1–1.5 meters high; leaves green above, the sparse pubescence of simple hairs; carpels 6 mm. long.

BOMBACACEAE. Cotton Tree Family

Trees or sometimes shrubs, frequently armed with stout prickles; leaves mostly deciduous, alternate, petiolate, simple or compound; pubescence chiefly of stellate hairs; flowers large or small; calyx 5-lobate or truncate, sometimes opening irregularly; petals 5; stamens 5 or very numerous, the filaments sometimes united to form a tube; fruit dry or fleshy, 2–5-celled, dehiscent or indehiscent; seeds 2 or more in each cell.—The genus *Bernoullia* is represented in Central America.

BOMBACOPSIS Pittier

Tall trees; leaves digitately compound, the leaflets entire; flowers large but commonly less than 15 cm. long; stamens fewer than 100, the tube elongate; fruit a large capsule.

Bombacopsis Fendleri (Seem.) Pittier. *Pochote, Cedro espinoso, Cedro pochote. Bombax nicoyense* Pittier, Repert. Sp. Nov. 13: 315. 1914 (forests of Nicoya, *Tonduz 13497*). Open forests of the Pacific coast. Also in Panama. A tree as much as 30 meters high, the trunk densely armed with hard, sharp prickles; leaflets 5–9, oblong, rounded and sometimes short-pointed at the apex, glabrous; flowers 8.5–10 cm. long, white or pink, the calyx 8 mm. long, truncate; capsule 6–7 cm. long, the numerous seeds embedded in an abundant, brown wool. The flowers appear when the tree is leafless. Pittier states that the wood is of excellent quality and similar to that of cedro amargo (*Cedrela*), its chief defect being that it is hard to dry. This species has been reported erroneously as *Bombax ellipticum* HBK., an unarmed tree. For the latter there have been recorded the following Indian names that probably refer to the present species: Puri (Bribrí); Brishakra (Brunka); Kuri (Cabécara).

Bombacopsis sessilis (Benth.) Pittier. Buenos Aires. Also in Panama. An unarmed tree 10–20 meters high, the bark greenish; leaflets 5 or 6, rounded at the apex, 6–13 cm. long; flowers almost 15 cm. long, pink or white; capsule ovoid, the seeds 1 cm. long.

BOMBAX L.

Other species are known in Central America.

Bombax Barrigon (Seem.) Dcne. *Ceibo.* Common in forests of the Pacific coast. Also in Panama and Colombia. A deciduous tree, often 15 meters or more in height, the trunk somewhat swollen near the base, green; leaflets 7–9, oblanceolate or obovate, glabrous, short-acuminate; flowers large, white, the stamens very numerous, commonly more than 1,000; capsule oblong, 18 cm. long, filled with a gray wool and numerous small seeds. In Panama this species receives the name of Barrigón ("big-bellied"), in reference to the swollen trunk, and the flowers are called Motas. The wood is soft and useless, but the wool is employed like that of *Ceiba pentandra.*

CEIBA Medic.

Another Central American species grows in Guatemala.

Ceiba pentandra (L.) Gaertn. *Ceiba.* Common in forests of the coasts. Widely dispersed in tropical America. A giant tree, the

trunk sometimes 40 meters high, supported by large buttresses, the bark green and smooth, but covered with short, conic prickles; leaflets 5–7, narrow, acuminate, glabrous, pale beneath; flowers 3–3.5 cm. long, white or pink; stamen tube short, dividing into 5 branches that bear at the apex a few sessile anthers; capsule oblong, about 10 cm. long, filled with a silk-like cotton and numerous small, brown seeds. One of the most celebrated trees of tropical America, and one of the three or four largest trees of Central America, noteworthy for its ample, depressed crown, which is devoid of leaves during a part of the year. The cotton is employed for stuffing mattresses and pillows, and under the name Kapok it is employed in vast quantities in Europe and North America for making mattresses, cushions, life belts, and many other articles. The greater part of the commercial kapok is exported from western Africa and the East Indies. The wood has no use at the present time, but in some regions it has been employed for making canoes and rafts. It is pinkish white or ashy brown, weak and soft but firm and rather substantial, considering its light weight; it is not durable. The oil expressed from the seeds has been utilized in some regions for illumination and for soap making.

HAMPEA Schlecht.

Reference: Standley, Journ. Wash. Acad. Sci. 17: 394. 1927.

Trees or shrubs, the pubescence of small, stellate hairs; leaves long-petiolate, entire or lobate; flowers small, fasciculate in the leaf axils; bractlets 3 or more; calyx truncate or shallowly lobate; stamen tube short; fruit a 3-celled capsule, few-seeded.

Hampea appendiculata (Donn. Smith) Standl. Journ. Wash. Acad. Sci. 17: 395. 1927. *Buriogre, Burío. H. integerrima* var. *appendiculata* Donn. Smith, Bot. Gaz. 27: 331. 1899. La Palma, 1,550 meters, *Tonduz 12462.* Common in mountain forests of the central region, and in Guanacaste, at 600–1,600 meters; region of San Ramón. Endemic. A tree of 5–25 meters; leaves ovate, acute, entire, pale and tomentose beneath, with small appendages about 5 mm. long at the base of the blade; capsule 2–2.3 cm. long, the seeds 8 mm. long. A rather ornamental tree because of its abundant, white flowers.

Hampea panamensis Standl. Río Changuinola. Also in Panama. Similar to the preceding species; appendages of the leaves only 2 mm. long; capsule 1.5 cm. long, the seeds 5 mm. long. Known in Panama as Burío and Azote. The wood is yellowish gray and of medium fine grain.

Hampea platanifolia Standl. Journ. Wash. Acad. Sci. 17: 397. 1927. Forests near El Copey, 1,800 meters, *Tonduz 11667*. Endemic; collected also at Capulín (80 meters), and by Lankester on Río Pirrís. A shrub or tree of 4–7 meters; leaves large, 18–30 cm. or more in length, cordate at the base, 3–5-lobate; capsule 3.5–4.5 cm. long. A species very unlike other members of the genus, its leaves similar to those of *Ochroma*.

OCHROMA Swartz

Trees, the crown sparsely branched, depressed; leaves long-petiolate, rounded-ovate, usually shallowly lobate; flowers large, whitish, the stamens very numerous, united to form a tube; fruit a narrow, 5-angulate capsule, filled with a brown cotton and numerous small seeds.—These trees are characteristic of the lower regions, from sea level to an elevation of 1,000 meters. They prefer alluvial soil along streams and old clearings, and never are seen in virgin forest; sometimes after land has been cleared they cover the ground with seedlings, without any visible source of seeds near by (Pittier). The trunks are as much as 60 cm. in diameter and 25 meters in height. The trees grow with extreme rapidity, and their wood is soft and light. From earliest times the Indians have used the trunks for improvising means of transportation when descending or crossing rivers. The fibers of the bark are strong, and are employed for cordage. The cotton about the seeds is used for filling mattresses and pillows. The soft, porous wood is employed for honing razors and other fine instruments. It is reported that an infusion of the bark is an active emetic, and in Salvador the leaves are eaten by cattle, especially in the dry season, when forage is scarce. The wood is famous for its light weight, although other woods of even less weight are known. It is lighter than cork, spongy, pinkish white or pale reddish, sometimes somewhat brownish, and perishable when exposed to the elements. It is exported from Costa Rica and other countries for use in insulation of ice boxes, for life belts, and many other purposes. In the Atlantic coast of Costa Rica plantations of the trees have been made. At present, at least without more careful studies than have been made recently, it is impossible to state how many species of *Ochroma* occur in Costa Rica, or in Central America. Rowlee, who studied the trees in their native habitats, recognized nine species, four of them Central American. I do not believe that there are so many in Central America, and it is far from certain that there is more than one, but I have listed here the species published

by Rowlee, who divided them upon slight and probably unimportant characters. The Costa Rican trees were referred formerly to *O. lagopus* Swartz of the West Indies, which probably does not extend to the continent.

Ochroma bicolor Rowlee. Abundant in the plains of Santa Clara. Also in Nicaragua. A tree of 25 meters, the trunk as much as a meter in diameter; leaves green and glabrous above, whitish beneath and covered with a dense tomentum; flowers 10 cm. long, the calyx lobes not carinate; capsule 16 cm. long. Probably not distinct from *O. limonensis.*

Ochroma limonensis Rowlee, Journ. Wash. Acad. Sci. 9: 163. 1919. *Balsa.* Finca San Clemente, east of Río Bananito, *Rowlee 1.* Common in the Atlantic tierra caliente. Panama to Honduras. A tree of 30 meters, the trunk sometimes a meter in diameter; leaves almost glabrous above, densely covered beneath with a reddish brown tomentum; calyx lobes carinate outside; capsule 15 cm. long. Known in Honduras by the name Guano.

Ochroma velutina Rowlee, Journ. Wash. Acad. Sci. 9: 164. 1919. *Balsa.* Forests of Nicoya, *Tonduz 13498.* Common in forests of the Pacific coast; Cocos Island. Panama to Guatemala. A tree with broad crown; leaves densely stellate-tomentose on both surfaces; calyx lobes not carinate; flowers 8 cm. long.

PACHIRA Aubl.

Large or small, unarmed trees; leaves digitately compound, the leaflets entire; peduncles axillary, 1-flowered; flowers very large, 15–30 cm. long, the calyx truncate; petals linear or linear-oblong; stamen tube 4.5–10 cm. long, divided into numerous branched fascicles of stamens; fruit very large, somewhat woody, 5-valvate, fleshy within, the seeds 1.5 cm. or more in diameter, not surrounded by cotton.—There are probably two additional species in Central America.

Pachira aquatica Aubl. *Jelinjoche, Quirihuillo, Quirigüillo.* Swampy forests of the Pacific tierra caliente, and probably also of the Atlantic. Mexico to South America. A tree, usually less than 10 meters high, with pale, smooth bark; leaflets 5–7, narrow, short-acuminate, almost glabrous, pale beneath; petals reddish brown and greenish, the stamens purple; fruit ovoid, as large as a coconut, brown, the flesh whitish. The tree grows most commonly in open

swamps, in shallow water. It sometimes flowers when only 2–3 meters high, and a shrub of that size sometimes bears several of the large, heavy fruits. The flowers are showy. The seeds are eaten, boiled or roasted, in some parts of Central America.

Pachira pustulifera Pittier, Repert. Sp. Nov. 13: 315. 1914. La Florencia, near Turrialba, *Tonduz 11305*. Also at Las Vueltas de Tucurrique. Endemic. Leaflets finely tomentose beneath; petals 16 cm. long.

QUARARIBEA Aubl.

Reference: Visher, Bull. Soc. Bot. Genève II. 11: 199. 1920.

Shrubs or trees, glabrous or with pubescence of stellate hairs or stellate scales; leaves short-petiolate, entire or nearly so; peduncles 1-flowered, solitary, opposite the leaves; calyx tubular-obconic, 3–5-dentate; petals narrow, white; stamen column elongate, antheriferous at the apex; fruit 2-celled, hard, indehiscent, often 1-seeded.—Other species occur in Central America.

Quararibea asterolepis Pittier. Río Changuinola. Also in Panama. A medium-sized tree; leaves ovate, 20–25 cm. long, acuminate, rounded or subacute at the base, almost glabrous; calyx 2–2.5 cm. long; fruit 6 cm. long.

Quararibea funebris (Llave) Standl. Forests near Tilarán, Guanacaste. Extending to Mexico. A tree of 9 meters with broad crown; leaves oval to oblong-elliptic, 15–35 cm. long, acute, rounded at the base, barbate beneath in the axils of the nerves.

Quararibea obliquifolia (Standl.) Standl., comb. nov. *Matisia obliquifolia* Standl. Field Mus. Bot. 4: 232. 1929. Wet forest near Guápiles, 300–500 meters. Also in Panama. A tree of 10–15 meters, the flowers and fruits produced from pads along the main trunk; leaves petiolate, the blades obliquely oblong or rhombic-obovate, 17–22 cm. long, obtuse or rounded at the apex, very unequal at the base, on one side acute, on the other deeply cordate, with a broadly rounded auricle, stellate-puberulent beneath along the veins; pedicels 1.5–2 cm. long, the calyx campanulate, 6–8 mm. long, rounded at the base, minutely stellate-puberulent; fruit ovoid, 2–2.5 cm. long.

Quararibea parvifolia Standl. Field Mus. Bot. 4: 232. 1929. La Palma, Río Sixaola, *Dunlap 472*. Known only from the Changuinola Valley. A small tree; leaves very shortly petiolate, oblong to obovate-oblong, 5–18 cm. long, narrow-acuminate, almost glabrous, not barbate; calyx 14 mm. long, 4 mm. broad.

Quararibea platyphylla Pittier & Donn. Smith, Bot. Gaz. 23: 239. 1897. Río Naranjo, *Pittier & Tonduz 7579*. Forests of the tierra caliente; region of San Ramón. Endemic. A shrub or a small tree; leaves elliptic, 30 cm. long or less, acuminate, glabrous, not barbate, rounded at the base; calyx 12 mm. long, the petals 2 cm. long. Of this or some related species, under the name *Q. turbinata* Poir., Pittier states: "In young plants of this tree the branches develop as in the cacao plant, in whorls of 5, regularly spaced. Advantage is taken of this arrangement to make from slender branches beaters for whipping the beverage chocolate. The *Quararibea* grows chiefly in the tierra templada. It reaches a great size, but its wood is of mediocre quality and not durable. In Santa Clara it is called Garrocho."

Quararibea stenophylla Pittier, Repert. Sp. Nov. 13: 317. 1914. *Q. Chodati* Vischer, Bull. Soc. Bot. Genève II. 11: 207. *f. 5*. 1920 (La Colombiana, Llanuras de Santa Clara, *Pittier 13411*). Piuta, near Limón, *Pittier 12410*. Forests of the Atlantic coast; perhaps also in the Pacific tierra caliente. Also in Panama. A tree of medium size; leaves short-petiolate, oblong or narrowly elliptic, 13–22 cm. long, acuminate, rounded at the base, covered beneath with minute scales: calyx 1–1.5 cm. long.

STERCULIACEAE. Cacao Family

Herbs, shrubs, or trees, sometimes scandent, the pubescence chiefly of stellate hairs; leaves alternate, simple or rarely compound, provided with stipules; flowers small or large, commonly cymose, generally perfect, regular or sometimes zygomorphic; calyx gamosepalous, usually 5-lobate; petals 5 or none, free or united with the stamen column; stamens united, at least at the base, the tube usually provided with 5 staminodia; fruit dry or occasionally baccate, mostly 5-celled.—Other genera are represented in Central America.

BYTTNERIA L.

Shrubs, often scandent and prickly; flowers small, pedicellate, generally cymose or umbellate; calyx 5-lobate; petals 5, cucullate, unguiculate, produced dorsally into a long, narrow appendage; fruit a 5-celled capsule, covered with long spines, 5-seeded.

Byttneria aculeata Jacq. *Uña de gato*. Common in thickets, Meseta Central to the coasts. Widely distributed in tropical America. A shrub, armed with short, hooked prickles, often more

or less scandent, the branches hollow; leaves short-petiolate, lanceolate to ovate, entire or dentate, glabrous or pubescent, often spotted with silver; flowers purple-brown; capsule 7–10 mm. broad. A common weed of banana plantations, often forming dense thickets. Known in Panama by the names Zarza, Rabo de iguana, and Rangay.

Byttneria catalpifolia Jacq. *B. macrocarpa* Donn. Smith, Bot. Gaz. 23: 239. 1897 (Río Ceibo, near Buenos Aires, *Tonduz 6689*). In coastal thickets. Mexico to South America. An unarmed shrub, erect or scandent; leaves long-petiolate, ovate-cordate, entire, acuminate; capsule 2.5–3.5 cm. broad.

GUAZUMA Adans.

Guazuma ulmifolia Lam. *Guácimo, Guácimo blanco.* Common in thickets of the Pacific tierra caliente. Widely distributed in tropical America. A small or medium-sized tree, the crown depressed or rounded; leaves short-petiolate, oblong or ovate, dentate, covered with a pale pubescence of stellate hairs; flowers small, clustered in the leaf axils, the petals yellow; capsule oval, woody, hard, 2–4 cm. long, covered with thick, hard protuberances. The ripe fruit is almost black, and filled with a pulp having a sweet, agreeable flavor, but it is eaten only by children since the numerous large, hard seeds are unpleasant to the tongue. Both leaves and fruits are eaten by cattle. The wood is white and strong, but it is not used except for firewood. The bark contains a strong fiber that has been utilized in some regions for making twine. Pittier reports the following Indian names: Kudshur (Cabécara); Udshir (Bribrí); Dian-krá (Brunka); Shum-gín, Sun-gí (Térraba); Sururu (Guatuso).

HELICTERES L.

No other species are known from Central America.

Helicteres baruensis Jacq. Between Guachipelín and Liberia, Guanacaste, *Brenes 15579.* Mexico to northern South America. A shrub, the leaves short-petiolate, oval-ovate or elliptic-ovate, obtuse or acute, cordate at the base, whitish-tomentose beneath; flowers horizontal, zygomorphic, the calyx 3 cm. long, the red petals 4 cm. long; fruit recurved, densely tomentose, 5 cm. long.

Helicteres guazumaefolia HBK. *Rabo de puerco. H. retinophylla* R. E. Fries. Common in thickets of the Pacific tierra caliente. Mexico to South America. A shrub, the pubescence of abundant, stellate hairs; leaves oblong or ovate, dentate, 5–7-nerved;

flowers showy, axillary, erect, regular or nearly so, bright red, 2.5 cm. long, the petals erect, the stamens exserted; fruits hard and woody, spirally twisted like a screw, 3 cm. long. Easy of recognition by the curious fruits, quite unlike those of any other American plant. The bark contains a strong fiber. Other vernacular names current in Central America are Guacimillo, Majagüillo, Tornillo, and Barreno.

MELOCHIA L.

Herbs or small shrubs, the pubescence of simple or stellate hairs; leaves dentate; flowers small, cymose or clustered in the leaf axils; petals 5, spatulate, persistent; fruit a 5-celled capsule, 5-seeded. —Other species are known from Central America.

Melochia hirsuta Cav. *Raíz del toro.* Common in thickets or fields of the tierra caliente, especially the Pacific. Widely distributed in tropical America. Plants herbaceous, densely pilose, the leaves small, ovate; flowers purple, in dense, terminal spikes. Called Hierba del soldado in Panama.

Melochia lupulina Swartz. Common in thickets, Meseta Central to the Atlantic coast; region of San Ramón. A species of wide distribution. An erect herb or a small shrub, sometimes 2 meters high; leaves large, ovate, usually somewhat cordate at the base, pilose beneath; flowers white, clustered in the leaf axils, the calyx accrescent and pale in fruit; capsule pyramidal (depressed in the other species listed here).

Melochia melissaefolia Benth. *Mano de tigre.* Between Térraba and Boruca. A species of wide distribution. A low herb; leaves small, ovate; flowers clustered in the leaf axils; calyx not accrescent; bracts green, linear.

Melochia nodiflora Swartz. Thickets of the Pacific coast. Widely distributed in tropical America. An herb or shrub of 2 meters or less, the pubescence sparse; leaves small, green, ovate; flowers purple, clustered in the leaf axils, the bracts oblong or ovate, brown and papery; capsule depressed.

Melochia pyramidata L. Reported from Nicoya. Generally distributed in tropical America. An herb or shrub of 1.5 meters or less; leaves small, oblong to ovate, almost glabrous; flowers purple, clustered in the leaf axils; fruit pyramidal.

STERCULIA L.

Trees, the leaves simple or digitately compound, entire or lobate, petiolate; flowers of two sexes, paniculate, generally axillary; calyx 5-lobate, usually colored and corolla-like; petals none; fruit of 5 distinct, woody carpels which are dehiscent along the inner margin; seeds large, 1 to many in each carpel.—There probably are no other species in Central America.

Sterculia apetala (Jacq.) Karst. *Panamá.* Forests of the Pacific coast. Mexico to northern South America. A tall, corpulent tree, the trunk thick, the crown broad and dense; leaves long-petiolate, 30–50 cm. wide, 3–5-lobate, the lobes entire, almost glabrous or pilose beneath; calyx reddish, tomentose outside; seeds large. The large, brown seeds resemble chestnuts and often are known as Castañas. They are edible. The wood is used for construction. The inside of the carpels is covered with stiff, irritant hairs that penetrate the skin easily, causing much irritation.

Sterculia costaricana Pittier, Contr. U. S. Nat. Herb. 13: 449. *f. 77, 78.* 1912. Las Delicias del Reventazón, Llanuras de Santa Clara, 40 meters, *Pittier 16172.* A tree of 5 meters; leaves ovate, acuminate, entire, glabrous, 5–12 cm. long.

THEOBROMA L. Cacao

Trees, the leaves large, entire; flowers small, in axillary or lateral clusters, often produced upon the trunk; petals 6, unguiculate; fruit large, sessile, fleshy, 5-celled, the seeds surrounded by pulp.

Theobroma angustifolium DC. *Cacao de mico, Cacao silvestre.* Forests of the tierra caliente. Mexico to Panama. A tall tree with thick trunk, symmetrically branched, sometimes low and irregular, the bark smooth; leaves oblong or lanceolate, whitish beneath; flowers arising from young branches, bright yellow; fruit oval, more or less irregular, chestnut-colored or cinnamon-colored, not very large. Pittier states that in Nicoya, where the tree is abundant in forests, the seeds are used for preparing refreshing drinks, and that they yield a kind of cacao. The Bribrí name is reported as Soró.

Theobroma bicolor Humb. & Bonpl. *Pataste, Pataiste, Cacao pataste.* Forests of the tierra caliente; Pittier reports that it is scarce in Costa Rica, either wild or cultivated. Mexico to northern South America. A medium-sized tree, the leaves dimorphic, rounded-cordate or oblong, large, white beneath; flowers paniculate, arising

only from young branches, reddish; fruit ellipsoid, 15 cm. long, the pulp white, the rind thick and hard. The seeds are used like those of *T. Cacao* and are often mixed with them. The following Indian names are listed: Skar-ub (Bribrí); Uerba (Térraba); Scarvo (Bribrí); Carvu (Cabécara); Sapáron (Estrella); Erefa (Guatuso).

Theobroma Cacao L. *Cacao, Cacao criollo.* Cultivated from the most ancient times in Costa Rica, and also wild in the forests of the tierra caliente. Widely distributed in tropical America, at least in cultivation, and grown, at least on a small scale, in most tropical regions of the earth. It is from this species, planted on a large scale in the Atlantic coast, as well as in other regions of Costa Rica, that there is obtained the best grade of cacao. This is distinguished among the various cultivated forms by its elongate, fusiform fruits, thicker and rounded at the base, somewhat warty, with 5 deep furrows and 5 intermediate ones, which are less sharply marked; also by the yellowish white or pale rose section of its large seeds. Another character easy of recognition is the absence of flavor in the seed. The name cacao is of Nahuatl origin. Indian names reported for this species or *T. leiocarpa* are: Kuk (Rama); Tsiru-kurú (Cabécara); Tsirú (Bribrí); Kao-krá (Brunka); Ko (Térraba); Kau (Tiribí).

Theobroma leiocarpa Bernoulli. *Cacao calabacillo.* Cultivated commonly, and probably also wild. Widely distributed in tropical America, at least in cultivation. Considered by many authors a synonym of *T. Cacao*, but distinguished by the form of its fruits, which are more or less ovoid or globose, smooth, with 5 obscure furrows. The seeds are usually small and always depressed, with a purple cross section, and of bitter flavor. Regarding this species Pittier writes: "Commercially it produces a really inferior quality of cacao, because of its high tannin content, and it has other disadvantages that appear when it is considered carefully. Nevertheless it is produced upon a larger scale, and by a curious state of affairs that occurs also with coffee varieties, until a few years ago it was more favored commercially than really fine grades of cacao (*Theobroma Cacao*). *T. leiocarpa* is the species cultivated in the Orient."

Theobroma purpureum Pittier. *Cacao de mico, Cacao de ardilla.* Common in wet forests of the tierra caliente. Also in Panama. A shrub of 4 meters or less, the trunk simple; leaves digitately compound, the 5 leaflets 30–50 cm. long; flowers small, arising from the trunk; fruits about 7 cm. long, with white, edible pulp, covered with irritant hairs, yellow when ripe. Pittier states that the Bribrí

Indians use the roasted seeds for preparing a rather bitter beverage. This species has been reported from Costa Rica as *Herrania albiflora* Goudot. The Bribrí name is reported as Uis-ub.

Theobroma simiarum Donn. Smith, Bot. Gaz. 25: 145. 1898. *Cacao de mico, Teta negra.* Hacienda de La Concepción, Llanuras de Santa Clara, 200 meters, *J. D. Smith 6457.* Forests of the tierra caliente, but apparently rare. Endemic. A tall or medium-sized tree, sometimes 18 meters high, the crown narrow or small; leaves large, obovate-oblong, pale beneath; flowers red, arising on the trunk; fruit elongate and terete, velvety-pubescent, about 30 cm. long. The seeds are said to yield a kind of cacao. The tree is unique in appearance because of the abundant large fruits hanging from the trunk, and having the appearance of sausages. I have seen it only in the region of Guápiles. Indian names reported for this species are: Kráaku (Guatuso); Nunísup (Rama); Uirub (Bribrí); Dzug-mang-uá (Brunka); Ku-gín, Bik (Térraba).

WALTHERIA L.

Herbs or shrubs, the pubescence mostly of stellate hairs; leaves serrate or dentate; flowers small, clustered in the leaf axils; petals 5, persistent; stamens 5; fruit a 1-seeded capsule.

Waltheria americana L. *Escobilla blanca. W. indica* L. Common in thickets, Meseta Central to the coasts. An almost pantropic plant. An erect herb or a small shrub, densely pilose; leaves small, oblong to rounded-ovate, obtuse or rounded at the apex; petals yellow; flower clusters pedunculate. A common weed in many parts of Central America, especially near the coasts.

Waltheria brevipes Turcz. *W. rhombifolia* Donn. Smith, Bot. Gaz. 23: 3. 1897 (Río Ceibo, *Tonduz 4038*). Pacific tierra caliente. Mexico to Panama. A densely stellate-tomentose shrub; leaves on very short petioles, ovate, acute or obtuse, large, somewhat cordate at the base, rugose, pale; flower clusters sessile.

Waltheria glomerata Presl. Reported from Surubres. Mexico to Panama. A shrub, similar to the last preceding species; leaves oblong; petals white.

DILLENIACEAE. Dillenia Family

Trees or shrubs, often scandent; leaves alternate, simple, without stipules, usually very rough; flowers paniculate, terminal or

axillary, perfect or polygamous; sepals 3–5, distinct or nearly so, imbricate, persistent; stamens numerous, free; fruit of 1–5 dry carpels; seeds usually arillate.

CURATELLA L. Sandpaper tree

Curatella americana L. *Raspa-guacal, Hoja chigüe, Chumico de palo, Yahal.* Dry thickets of the Pacific coast, often forming small forests. Widely distributed in tropical America. A small tree, the trunk usually crooked; leaves large, oval or elliptic, thick, sinuate, very rough, almost sessile; flowers white, in axillary panicles; seeds black. The leaves are employed for polishing wood and cleaning dishes or pots. The wood is brown or reddish, rather hard and heavy, and utilized for fence posts, fuel, charcoal, and in some regions for cabinetwork.

DAVILLA Vandelli

Woody vines, the leaves oblong or obovate, very rough, thick, entire or nearly so; flowers paniculate, the petals yellow, caducous; sepals very unequal, the two inner ones erect and enclosing the fruit (sepals equal in the other genera).

Davilla Kunthii St. Hil. Thickets of the Atlantic coast. Widely distributed in tropical America. Leaves petiolate, 6–15 cm. long, rounded at the apex, pilose beneath, reticulate-veined; inner sepals pilose.

Davilla rugosa Poir. Thickets of the Pacific coast. Widely distributed in tropical America. Leaves almost glabrous, not reticulate-veined; inner sepals glabrous. Reported from Costa Rica under the name *D. multiflora* St. Hil.

DOLIOCARPUS Gmel.

Doliocarpus dentatus (Aubl.) Standl. Reported from Rodeo de Pacaca, *Pittier 1648*; region of San Ramón. Ranging to Brazil. A woody vine; leaves oblong or obovate, coriaceous, smooth; fruit of a single carpel; flowers clustered in the leaf axils.

TETRACERA L.

Woody vines; leaves oblong or obovate, rough, usually dentate; flowers white, in terminal panicles; fruit of 1–5 distinct, glabrous carpels.

Tetracera sessiliflora Triana & Planch. *Raspa-guacal.* Thickets and forest of the Atlantic coast. Widely distributed in tropical

America. A large vine; sepals glabrous within; fruit of a single carpel. The species of *Tetracera* are among the water vines (bejucos de agua) of Central America. From a section of the stem, properly handled, it is possible to obtain a considerable quantity of sap that has the appearance of water and will satisfy thirst. The leaves are used for polishing wood.

Tetracera volubilis L. *Raspa, Raspa-guacal.* Thickets of the Pacific coast. A species of wide distribution. Sepals sericeous within; fruit of 2–5 carpels. In Nicaragua the plant is called Hoja chigüe.

ACTINIDIACEAE. Actinidia Family

The family is represented in Central America by a single genus.

SAURAUIA Willd.

Shrubs or small trees, usually somewhat hispid, the pubescence often of stellate hairs; leaves alternate, petiolate, membranaceous or coriaceous, serrate or almost entire; flowers white, of medium size, paniculate, axillary, perfect or monoecious; sepals 5, imbricate; petals 5, united at the base or almost distinct; stamens numerous, united with the base of the corolla; ovary 3–5-celled; fruit a 3–5-celled berry, the small seeds numerous, surrounded by a watery pulp. The American species were monographed by Buscalioni in *Malpighia*, volumes 25–30, in a form that is exceedingly exasperating and difficult to consult. He has published numerous species from Central America, but they are based upon minute and inconstant characters, and I believe that the majority of his species have little systematic importance. The pulp of the fruit resembles the white of an egg, and is edible. The fruits sometimes are offered for sale in Central American markets.

Saurauia costaricensis Donn. Smith, Bot. Gaz. 23: 236. 1897. *Moco, Moquillo, Nance. S. ovalifolia* Donn. Smith, Bot. Gaz. 42: 292. 1906 (Río Navarro, Prov. Cartago, 1,100 meters, *J. D. Smith 4746*); *S. costaricensis* var. *brachitricha* Busc. Malpighia 27: 12. 1915. Cartago, 1,270 meters, *Cooper 5714*. Common in forests of the mountains of the central region, 1,200–2,400 meters; San Ramón, 1,000 meters. Probably also in Panama. A shrub or tree of 3–6 meters with few branches; branches hispid with appressed hairs or sometimes almost glabrous; leaves large, oblanceolate-oblong to obovate, obtuse to acuminate, rounded to acute at the base, rough on the upper surface and sometimes hispid, beneath stellate-pilose

or almost glabrous, serrulate; panicles almost equaling the leaves or sometimes much shorter, the flowers numerous; ovary pilose. Var. *dolicotricha* Buscalioni (Malpighia 27: 15. 1915) is a form in which the hairs of the branches are as much as 5–7 mm. long and spreading.

Saurauia Engleriana Buscalioni, Malpighia 27: 131. 1916. *S. Engleri* Busc. op. cit. 25: 10. 1912, nomen. Curridabat, 1,200 meters, *Pittier 56*. Hairs of the branches appressed, somewhat dilated at the base; leaves about 20 cm. long and 9–10 cm. wide, acute, rounded to acute at the base, denticulate, pulverulent-setulose on the lower surface; panicles small, few-flowered; ovary pilose. Probably a mere form of *S. costaricensis*.

Saurauia Pittieri Donn. Smith, Bot. Gaz. 23: 237. 1897. *Moco*. Forests of La Palma, 1,550 meters, *Pittier 10163*. Forests in the region of the Meseta Central, 1,400–1,800 meters. Endemic. A small tree, the branches densely furfuraceous-setulose; leaves oblong-obovate, 18–25 cm. long, subobtuse, acute at the base; panicles almost as long as the leaves; ovary pilose.

Saurauia pseudocostaricensis Buscalioni, Malpighia 27: 25. 1915. Alajuelita, near San José, 900 meters, *J. D. Smith 4745*. Branches sparsely setulose and pulverulent; leaves oval, about 20 cm. long and 8–12 cm. wide, acute or cuspidate, rounded at the base, setulose beneath along the veins but almost glabrous elsewhere, barbate in the axils of the nerves; panicles shorter than the leaves; ovary pilose. Probably not distinct from *S. costaricensis*.

Saurauia pseudopittieri Buscalioni, Malpighia 30: 97. 1927. Tuis, Prov. Cartago, 650 meters, *Pittier 7318*. Branches tuberculate-setulose; leaves obovate, 17–20 cm. long, 8–11 cm. wide, obtuse or acuminate, acute at the base, tuberculate-pulverulent on the upper surface, and beneath on the nerves; panicles equaling the leaves. The plant has been reported from Costa Rica under the name *S. serrata* DC.

Saurauia pseudorubiformis Buscalioni, Malpighia 27: 149. 1916. Volcán de Turrialba, 2,280 meters, *Pittier 13202*. Also at La Palma de San José and on Poás. Endemic. Branches setulose-pulverulent, the hairs spreading; leaves 15–22 cm. long, 7–10 cm. wide, acute or acuminate, rounded at the base, denticulate, rough on the upper surface, soft and stellate-pilose beneath; panicles shorter than the leaves; ovary glabrous. Perhaps not distinct from *S. rubiformis*.

Saurauia pseudoscabrida Buscalioni (Malpighia 25: 10. 1912) was not formally published, the author reducing the name to synonymy, although I do not know under what species.

Saurauia rubiformis Vatke, Linnaea 11: 221. 1837. *S. polyantha* Gilg in Engl. & Prantl, Pflanzenfam. 3, pt. 6: 128. *f. 67.* 1893. Alto de La Cruz de Candelaria, *Hoffmann 814.* Collected in various parts of the central region. Endemic. A shrub or small tree, the branches densely covered with short, thick, spreading hairs; leaves obovate, very rough on the upper surface, setulose beneath, obtuse or acuminate, obtuse at the base; panicles equaling or longer than the leaves; flowers monoecious; ovary glabrous.

Saurauia setosa Standl., sp. nov.—Frutex vel arbuscula 3–6-metralis, ramulis dense pilis longissimis patentibus basi paullo dilatatis substramineis hispidis; folia petiolata inter maxima membranacea, petiolo ut ramulis dense hispido; lamina anguste elliptico-oblonga 20–35 cm. longa 9–13 cm. lata longe anguste acuminata, basi obtusa vel subobtusa, supra densiuscule pilis longis rigidis patentibus hispida, subtus ubique ad costam densius hispida in axillis nervorum interdum barbata, in toto margine serrata, dentibus angustissimis salientibus; paniculae laxe pauciflorae atque longe pedunculatae sed foliis multo breviores, floribus breviter pedicellatis; sepala late ovata apiculato-acuta dense hispida 6–7 mm. longa; petala alba vel rosea 10–12 mm. longa; ovarium densissime pilosum. —Wet forest, Cerro de Las Caricias, north of San Isidro de Heredia, 2,000–2,400 meters, *Standley & Valerio 51979* (type in Herb. Field Mus.); also *No. 51994* from the same locality; Yerba Buena, in the same region, *Standley & Valerio 49935, 49905;* La Hondura, Prov. San José, 1,300–1,700 meters, *Standley 37598.*—A species easy of recognition because of the very long hairs that cover all parts of the plant. It is strange that Buscalioni has not described it, but I have been unable to find a description among the numerous Costa Rican species that he published, and it is possible that the plant has escaped other collectors.

Saurauia yasicae Loes. *S. yasicae* var. *laevigata* Busc. Malpighia 29: 366 (Tuis, 630 meters, *Pittier 7320*). Wet forests of the Atlantic slope; San Pedro de La Calabaza. Nicaragua. A shrub or small tree, the branches somewhat scurfy; leaves smaller than in other species, obovate-oblong, acuminate, acute at the base, rough on the upper surface; panicles shorter than the leaves; ovary pilose.

OCHNACEAE. Ochna Family

Herbs, shrubs, or trees, glabrous; stipules conspicuous, entire or pectinate; leaves simple, entire or dentate; flowers small or large, solitary and axillary or paniculate, with 5 sepals and 5 petals; stamens 5–10 or numerous; ovary 3–10-celled; fruit of 1–10 drupes inserted upon a thickened gynophore, or a capsule.—No other genera are known from Central America.

CESPEDESIA Goudot

In North America there is a single species.

Cespedesia macrophylla Seem. Forests of the Atlantic coast. Nicaragua to Colombia. A tree of 10–20 meters, the trunk as much as 60 cm. in diameter; stipules narrow, 4–6 cm. long; leaves very large, clustered near the apex of the branch, 30–70 cm. long, obovate-spatulate, narrowed toward the base; panicles very large, the flowers yellow, the petals almost 2 cm. long. A very showy tree when covered with the great panicles of yellow flowers; noteworthy for the extremely large leaves.

OURATEA Aubl.

Glabrous trees or shrubs; leaves alternate, persistent, coriaceous, serrate or entire; flowers yellow, in terminal or lateral racemes or panicles, the pedicels nodose at the base; sepals imbricate; petals unguiculate, obovate; stamens 10; fruit of 5 or by abortion fewer, 1-seeded, black drupes.—Other species occur in Central America.

Ouratea costaricensis Standl., sp. nov.—Frutex simplex 2.5-metralis glaber; stipulae lineares rigidae 1.5 cm. longae; folia inter maxima subsessilia anguste oblanceolate-oblonga ca. 53 cm. longa et 12 cm. lata sensim acuminata basin versus longe sensim angustata, basi ipsa anguste rotundata et subcordata, in tota longitudine arcte arguteque serrata, supra opaca nervis planis vel subprominentibus, subtus sublucida costa nervisque prominentibus, nervis lateralibus paucis adscendentibus valde arcuatis; paniculae parvae (perfectae non visae) pauciramosae pauciflorae; drupae ovales 1 cm. longae nigrae.—Wet forest near Guápiles, Prov. Limón, 300–500 meters, *Standley 37083* (type in U. S. Nat. Herb.).—A shrub of 2.5 meters, known only from incomplete specimens, although certainly a species distinct from all others known from Central America.

Ouratea Valerii Standl., sp. nov.—Stipulae non visae, deciduae; folia inter maxima crasse 1 cm. longe petiolata coriacea oblonga ca.

45 cm. longa atque 14 cm. lata subintegra, margine revoluto, basi rotundata medio latissima, supra opaca nervis planis, nervis subtus prominentibus; panicula maxima pauciramosa multiflora 5 cm. longe pedunculata 30 cm. longa et fere aequilata, ramis adscendentibus crassis, pedicellis gracilibus 1.5–1.8 cm. longis; alabastra anguste ovoidea acutiuscula; sepala lanceolata vel anguste lanceolata 12 mm. longa attenuata; petala lutea 1.5 cm. longa et ultra; stamina 1 cm. longa.—Playa Blanca, Golfo Dulce, *Manuel Valerio 435* (type in Herb. Field Mus.). A very distinct species because of its large, almost entire leaves.

Ouratea Wrightii (Van Tiegh.) Riley. Common in forests and thickets of the Pacific tierra caliente; region of San Ramón. Honduras to Panama. A shrub or tree as much as 5 meters high; leaves lanceolate or elliptic-oblong, 8–15 cm. long, acuminate, serrate or almost entire, acute at the base; panicles small, with few branches and flowers; drupes black.

SAUVAGESIA L.

Small, slender herbs; stipules pectinate-ciliate; leaf blades small, callus-margined; flowers small, pink, white, or purple, axillary or racemose; sepals 5, subequal, appressed to the capsule; petals 5, deciduous; outer stamens sterile, separated from the 5 perfect stamens by 5 petaloid staminodia; capsule septicidally 3-valvate, containing numerous seeds.—No other species are known from Central America.

Sauvagesia erecta L. Grassy places, Meseta Central to the coasts; region of San Ramón. Widely distributed in tropical America. Plants erect, usually 20–30 cm. high; lobes of the stipules without glands; leaves lanceolate, acute, serrulate, attenuate to the base; flowers axillary, pink, the sepals 5 mm. long, the pedicels long and slender.

Sauvagesia pulchella Planch. Maderal de San Mateo; between Alajuela and Grecia; collected only by Brenes. Ranging to northern South America. Similar to the other species, but distinguished by the fact that the thread-like lobes of the stipules bear small glands at about the middle.

Sauvagesia tenella Lam. Maderal de San Mateo; between Grecia and Alajuela; collected only by Brenes. Widely distributed in tropical America. Similar to *S. erecta*, but the plants small, 10 cm. high or less, and the sepals only 2 mm. long.

CARYOCARACEAE. Caryocar Family

The family is represented in Central America by a single genus and species. The other members of the group are South American.

CARYOCAR L.

Caryocar costaricense Donn. Smith, Bot. Gaz. 55: 431. 1913. *Ajo, Ají, Ajillo.* Río del Volcán, Diquís Valley, 250 meters, *Pittier 12115.* A tall tree; leaves opposite, digitately compound, the 3 leaflets oblong-elliptic, 10–14 cm. long, acuminate, acute at the base, short-petiolulate, almost entire, glabrous; flowers in terminal, pubescent racemes, with the odor of garlic; calyx lobate; petals 5, yellow, 2 cm. long; stamens very numerous, long; ovary 4-celled; fruit a large drupe. The seeds of some South American species are edible, and of excellent flavor.

MARCGRAVIACEAE. Marcgravia Family

Glabrous, epiphytic shrubs; leaves alternate, usually coriaceous, almost sessile, often dimorphous; inflorescence terminal, racemose, generally pendulous; bracts inserted above or at the base of the pedicels, greatly modified, nectariferous; flowers perfect, with 5 imbricate sepals; petals 5, united at the base or higher, separating as a cap; stamens 3–40; fruit globose, coriaceous or fleshy, indehiscent, with 5 to many cells.—No other genera are known in North America.

MARCGRAVIA L.

Inflorescence almost always umbelliform, the central flowers sterile; bracts free from the pedicels, usually stipitate, generally helmet-shaped, inverted because of the pendent inflorescence and filled with nectar; petals united; stamens 10–40.—Other species are known from Central America. One of the most curious and interesting groups of Central American plants, easy of recognition because of the nature of the inflorescence. The nectar within the bracts is much sought by insects and hummingbirds. Although essentially epiphytic plants, sometimes, especially in the coastal forests, they are huge vines that climb to the tops of the highest trees, and have thick trunks. In Honduras the name Cachimbą (tobacco pipe) is given to these plants, in reference to the form of the bracts. The young plants, much more plentiful than the adult ones, are common in the forests. They are slender plants, clinging closely to the trunks of trees by aerial roots, and have small leaves quite unlike those of adult individuals.

Marcgravia affinis Hemsl. Diag. Pl. Nov. 3. 1878; Biol. Centr. Amer. Bot. 5: *pl. 6, f. 7-12.* Type, *Endres 185*, without definite locality. Region of San Ramón, at 850 meters. Endemic. A slender plant, the leaves almost sessile, lance-oblong, acuminate; umbels with only 10–15 flowers, these forming an angle with the pedicel, small; nectaries helmet-shaped, long-stipitate. The flowers and bracts are much smaller than in other Costa Rican species.

Marcgravia membranacea Standl., sp. nov.—Frutex epiphyticus pendulus gracilis 1–2-metralis; folia magna submembranacea 8 mm. longe petiolata oblongo-elliptica 7–21 cm. longa 7–9 cm. lata abrupte breviter acuminata, basi obtusa et subaequalia, costa subtus elevata, nervis lateralibus utroque latere ca. 7 gracilibus valde prominentibus; umbellae longe pedunculatae ca. 10–15-florae statu fructifero ad 5.5 cm. latae, pedicellis patentibus vel subreflexis crassis ca. 1.5 cm. longis lenticellatis; bracteae tubuloso-cucullatae fere sessiles 14 mm. longae supra basin paullo constrictae apice acutiusculae usque ad 5 mm. crassae; sepala 4.5 mm. longa; corolla late ovalis 1 cm. alta apice rotundata et apiculata.—Near Pejivalle, Prov. Cartago, 900 meters, *Standley & Valerio 47089* (type in Herb. Field Mus.). Easy of recognition because of the thin, almost membranaceous leaves, very unlike the coriaceous leaves of most other species.

Marcgravia nepenthoides Seem. has been reported from Costa Rica. The species ranges from Nicaragua to Guatemala, but I have seen no Costa Rican specimens.

Marcgravia Pittieri Gilg, Bot. Jahrb. 42: 124. 1908. Near Río de La Unión, Diquís Valley, *Pittier 12118*. Leaves oblong or oblong-lanceolate, narrow-acuminate, the nerves conspicuous on the lower surface; pedicels 2.3 cm. long, the flowers inserted at an angle with the pedicel; bracts 1 cm. long, stipitate, tubular; corolla ovoid, 7 mm. long; fruit globose, 1.5 cm. broad.

Marcgravia polyantha Delpino. Common on the Atlantic slope, ascending the slopes of the central volcanoes to 2,400 meters. Mexico to Brazil. Leaves narrowly lance-oblong, terminated by a long, narrow acumination; umbel with very numerous flowers, the pedicels slender 6 cm. long; flowers not forming an angle with the pedicels; bracts almost sessile, helmet-shaped, 1.5 cm. long. The young leaves, as in other species, often are handsomely tinted with bronze. The fruits are reddish.

Marcgravia rectiflora Triana & Planch. Common in forests of the temperate and colder regions, 1,300–2,500 meters; region of San Ramón, 1,250 meters. Ranging to northern South America and the West Indies. A large epiphyte, the leaves coriaceous, oblong or narrowly oblong, acuminate, the nerves obsolete; umbels with fewer than 20 flowers, these not forming an angle with the pedicels; bracts tubular, short-stipitate; corolla whitish, about 12 mm. long; fruits globose, as much as 1.5 cm. in diameter.

Marcgravia Tonduzii Gilg, Bot. Jahrb. 42: 125. 1908. Forests of Las Vueltas, near Tucurrique, *Tonduz 12965*. Guayabo; Reventazón; El Arenal, Guanacaste. Endemic. Leaves lance-oblong, large, narrow-acuminate, the nerves conspicuous on the lower surface; pedicels thick, the flowers inserted at an angle with the pedicels; bracts helmet-shaped, stipitate, 2.5–3 cm. long; corolla narrow, conic, 12 mm. long.

Marcgravia Waferi Standl., sp. nov.—Folia breviter crasse petiolata coriacea, lamina lanceolato-oblonga ca. 6.5 cm. longa et 2.5 cm. lata acuta vel breviter obtuse acuminata basi obtusa vel subrotundata, coriacea, nervis utrinque obsoletis, costa subtus prominente; inflorescentia breviter pedunculata umbelliformis pauciflora, pedicellis 1.5–2.5 cm. longis, floribus oblique insertis; bracteae tubulosae breviter stipitatae 1.5 cm. longae apice rotundatae et vix dilatatae; sepala 3 mm. longa; fructus globosus 1 cm. diam. apice umbilicatus.—Cocos Island, abundant along a small stream, Wafer Bay, *H. K. Svenson 327* (type in Herb. Field Mus.).

NORANTEA Aubl.

Flowers all fertile, the petals free or united only at the base; stamens numerous; bracts inserted near the base or middle of the pedicel, spoon-shaped or ladle-shaped.—One or two additional species occur in Central America.

Norantea albido-rosea Gilg, Bot. Jahrb. 42: 126. 1908. Río de Las Vueltas, Tucurrique, *Tonduz 13108*. Leaves obovate-oblong, almost sessile, 8–10 cm. long, obtuse, coriaceous; racemes short and umbelliform, with about 20 flowers, the pedicels 7 cm. long; corolla pinkish white; fruits globose, 1–1.5 cm. in diameter.

Norantea Brenesii Standl., sp. nov.—Frutex epiphyticus ramosus omnino glaber, ramis crassis teretibus rugosis brunnescentibus vel ochraceis, internodiis brevibus; folia majuscula brevissime petio-

lata crasse coriacea rigida, petiolo crasso vix ultra 4 mm. longo et fere aequilato; lamina obovato-oblonga 11–12 cm. longa 5–6 cm. lata apice obtusissima vel subrotundata, basin versus paullo sensim attenuata, basi ipsa obtusa vel subrotundata, utrinque opaca, hydathodis hypophyllis parvis lenticelliformibus utroque latere 3–4 in 2 tertiis superioribus laminae seriem 5 mm. a margine distantem formantibus, costa crassa vix elevata, nervis lateralibus tenerrimis obscuris angulo recto vel angustiore adscendentibus; racemi breves vel paullo elongati pauciflori interdum subumbelliformes, rhachi usque 7 cm. longa, pedicellis crassissimis, ad anthesin 1.5–2 cm. longis, serius ad 3.5 cm. longis erecto-patentibus; nectaria prope medium pedicelli vel paullo inferius inserta arcte sessilia late galeiformia 1.5 cm. longa ore 12 mm. lata crasse coriacea apice obtusa; prophylla calyci approximata omnino sepaloidea; sepala orbicularia apice late rotundata coriacea ad 1 cm. longa; corolla caduca globosa paullo ultra 1 cm. longa; fructus late ovoideo-globosus apice mammillato-apiculatus basi late rotundatus 2 cm. latus.—La Palma de San Ramón (Piedades Sur), 1,100 meters, October, 1929, *Brenes 11384* (type in Herb. Field Mus.); also *No. 17158* from the same locality. La Palma de San Ramón, *Brenes 15143, 5736, 5570, 20628, 3760.* La Balsa de San Ramón, 950 meters, *Brenes 4925.*

Norantea subsessilis (Benth.) Donn. Smith. *N. costaricensis* Gilg, Bot. Jahrb. 25, Beibl. 60: 31. 1898 (Alto de La Cruz, *Hoffmann 542*). Common in forests of the central region, ascending to 2,400 meters; also in the Atlantic coast. Extending to Colombia. A pendent shrub, forming dense tangles upon trees; leaves obovate-oblong, thick, obtuse, almost sessile, the nerves obsolete; rachis of the inflorescence somewhat elongate, the flowers rather few, the pedicels 5–7 cm. long; bracts inserted near the base of the pedicel, 1.5 cm. long; corolla 1 cm. long.

RUYSCHIA Jacq.

Pendent epiphytes, the leaves petiolate or almost sessile; flowers arranged in an elongate raceme; bracts inserted above the middle of the pedicel, plane or concave, sometimes thickened; stamens 5; petals almost free.—It is probable that no other species are known from Central America.

Ruyschia Jimenezii Standl., sp. nov.—Frutex glaber pendulus epiphyticus ad 1.5 m. longus; folia subcoriacea petiolata, petiolo crasso 5–13 mm. longo; lamina oblongo-oblanceolata vel obovato-

oblonga 6–9 cm. longa 2–3.5 cm. lata versus apicem obtusum interdum paullo angustata, basin versus cuneato-angustata, supra enervia, nervis lateralibus subtus prominulis; racemi 10 cm. longi et ultra multiflori, pedicellis crassis angulo fere recto patentibus 1.5–2 cm. longis; bracteae prope medium pedicelli insertae concavae crassae 6–8 mm. longae sessiles basin versus angustatae; sepala rotundata 2.5–3 mm. longa; petala viridia, alabastro globoso 4 mm. alto; fructus ovoideus 6 mm. longus apice mammillatus.—La Palma, Prov. San José, 1,600 meters, *Standley & Jiménez 32914* (U. S. Nat. Herb., type); Yerba Buena, Prov. Heredia, 2,000 meters, *Standley & Valerio 49160*. A much stouter plant than the other Costa Rican species.

Ruyschia phylladenia Sandwith, Kew Bull. 153. 1930. Las Cóncavas, Prov. Cartago, 1,200 meters, *Lankester K93;* collected in various localities of the Province of Cartago; region of San Ramón, at 800–1,100 meters. Endemic. An epiphytic shrub, or sometimes terrestrial; leaves short-petiolate, obovate or oblong, 4–8 cm. long, obtuse or rounded at the apex; racemes short or elongate, with numerous flowers, the pedicels 5–8 mm. long; bracts inserted above the middle of the pedicel, spatulate, 4–5 mm. long; flower buds 5 mm. long.

Ruyschia Valerii Standl., sp. nov.—Frutex epiphyticus glaber; folia crasse 2–3 mm. longe petiolata lanceolato-oblonga 5–6 cm. longa 1.5–2.5 cm. lata acuminata basi obtusa coriacea enervia, costa subtus prominente; racemi pauciflori 6–7 cm. longi, pedicellis crassis 3–5 mm. longis; bracteae basi floris insertae spathulatae 5 mm. longae versus basin sensim angustatae; sepala late rotundata 1.5 mm. longa; petala oblonga 3.5 mm. longa; fructus globosus 3.5 mm. altus apice mammillatus.—Los Ayotes, near Tilarán, Guanacaste, 600–700 meters, *Standley & Valerio 45454* (type in U. S. Nat. Herb.). El Silencio, Guanacaste, 750 meters, *Standley & Valerio 44706*. Similar to *R. phylladenia*, but differing in the acuminate leaves, and in the bracts, inserted near the base of the flower and not near the middle of the pedicel.

SOUROUBEA Aubl.

Souroubea guianensis Aubl. Region of Guápiles; reported from both coasts. Central and South America. An epiphytic shrub, with large aerial roots; leaves short-petiolate, oblong-obovate, coriaceous, obtuse; flowers arranged in long racemes, the pedicels elongate

and thick; bracts large, inserted at the apex of the pedicel, consisting of an elongate spur and two linear, elongate blades.

THEACEAE. Tea Family

Trees or shrubs; leaves alternate, coriaceous, without stipules; flowers perfect, usually axillary and solitary, commonly subtended by 2 bracts; sepals 4–7, free or somewhat united at the base, persistent or deciduous; petals generally 5, free or united; ovary 2–10-celled; fruit dehiscent or indehiscent.—No other genera are represented in Central America. The most important plant of the family is *Camellia chinensis* (L.) Kuntze, tea, native of southeastern Asia.

EURYA Thunb.

Shrubs or trees; leaves serrate, coriaceous; flowers small, solitary or fasciculate in the leaf axils; sepals 5, ciliate; petals white; fruit indehiscent, 2–5-celled, with few seeds in each cell.

Eurya Seemanniana Pittier. *Coral.* Forests of the central region, ascending the slopes of the volcanoes, at 1,500–2,600 meters; region of San Ramón, at 1,100 meters. Panama. A shrub or tree of 3–15 meters, the bark smooth, pale brown; leaves petiolate, oblong-lanceolate, 9–14 cm. long, narrow-acuminate, acute or obtuse at the base, serrulate or almost entire, glabrous above, densely sericeous beneath; flowers short-pedicellate, clustered in the leaf axils, about 8 mm. long; fruit black, globose, 8 mm. long. Known in Panama by the name Sajinillito.

Eurya theoides (Sw.) Blume. Forests of the region of Santa Clara de Cartago, and in Dota, 1,500–3,000 meters; region of San Ramón, at 1,100 meters. Mexico and Central America. A shrub or small tree, 4–6 meters high; leaves obovate-elliptic or oblong, 5–10 cm. long, acute or acuminate, serrulate, glabrous; flowers solitary or clustered in the leaf axils, the pedicels long and slender; fruits 6–7 mm. long.

LAPLACEA HBK.

No other species are known from Central America.

Laplacea Brenesii Standl., sp. nov.—*Llorón, Yoro.*—Arbor 15–30-metralis, coma rotundato-conica, cortice griseo, ut videtur dense ramosa, ramulis crassiusculis subteretibus ferrugineis dense foliatis, vel internodiis interdum elongatis, novellis minute sericeo-tomentellis cito glabratis; folia breviter petiolata coriacea, petiolo usque 1 cm. longo crasso supra canaliculato; lamina oblongo-ovata, oblongo-

elliptica vel interdum oblongo-obovata 8–20 cm. longa 3–8 cm. lata sensim vel abrupte acuminata, basi paullo inaequali acuta et interdum breviter contracto-decurrens, in fere toto margine arcte crenata vel interdum crenato-undulata, in sicco fusca, in statu juvenili sericea, cito glabrata, foliis adultis glaberrimis, costa supra plana vel subimpressa subtus elevata, nervis lateralibus utroque latere circiter 14 angulo semirecto vel latiore adscendentibus prominentibus subarcuatis prope marginem irregulariter conjunctis; pedunculi axillares 1–2-flori crassiusculi suberecti apice interdum subrecurvi minute tomentulosi vel glabrati plerumque 4-5 cm. longi; sepala orbicularia vix ultra 3 mm. longa apice late rotundata extus dense minute tomentulosa, interiora saepe longiciliata; petala alba ovalia vel late oblonga 1.5-2 cm. longa apice rotundata basi connata intus glabra extus prope basin vel ad medium dense minute stellato-tomentella superne glabra; stamina numerosissima circiter 3 mm. longa glabra, antheris et filamentis aequilongis, filamentis crassis; capsula 5–6-locularis ovalis 2 cm. longa 1 cm. vel ultra lata subangulata griseo-sericea vel glabrata obtusa basi rotundata; semina ala inclusa 16 mm. longa 5–6 mm. lata brunnescentia, ala tenui obtusa.—In forest, Los Angeles de San Ramón, 1,050 meters, August, 1925, *Brenes 4379* (type in Herb. Field Mus.). La Palma y El Socorro de San Ramón, *Brenes 6215*. La Palma de San Ramón, 1,050 meters, *Brenes 6201, 5791, 5357*. Between La Balsa and Cataratas de San Ramón, 850 meters, *Brenes 4506*.

Laplacea semiserrata (Mart. & Zucc.) Cambess. *Ira colorado*. Chirripó Grande, *Ralph E. Danforth;* reported from Cañas Gordas and San Pedro de Calabaza. Mexico(?) to Brazil. A medium-sized or tall tree, sometimes 30 meters high, with a small crown, the leaves clustered at the ends of the branches, oblanceolate, about 8 cm. long, obtuse, attenuate to the base, somewhat serrulate above the middle, the two sides of the blade very unequal; flowers white, malodorous, axillary, solitary, 4 cm. broad, the large sepals sericeous; fruit capsular.

PELLICIERA Planch. & Triana

The genus consists of a single species.

Pelliciera Rhizophorae Triana & Planch. *Mangle piñuela*. Reported from Diquís, Pacific Coast; Puerto Jiménez. Extending to Colombia. A small tree of mangrove swamps, 5–7 meters high; leaves oblong-lanceolate, acute, thick and coriaceous, entire; flowers white or pink, sessile, 5 cm. long, subtended by 2 stipule-like bract-

lets; fruit woody, obovate, 6–7 cm. long, 10-sulcate; stamens 5. Called Palo de sal in Panama.

TERNSTROEMIA Mutis

There are probably one or two additional species in Central America.

Ternstroemia Tepezapote Schlecht. & Cham. Forests of the region of Dota and the region south of Cartago, also on the slopes of Irazú, at 1,800–2,200 meters. Mexico to Panama. A shrub or tree of 2–6 meters; leaves oblanceolate or oblong-obovate, obtuse, attenuate to the base, thick and coriaceous, entire, somewhat serrulate near the apex; flowers axillary ,pedicellate, the sepals 1 cm. long, the petals thick, pink outside, dark red within; fruit indehiscent, ovoid, as much as 2 cm. long, coriaceous. The Mexican and Central American species of *Ternstroemia* are all much alike, and it is not known definitely whether there are several of them or whether all may not be forms of one variable species.

GUTTIFERAE

Trees or shrubs, often epiphytic, or herbs, usually glabrous; leaves opposite, sessile or petiolate, entire; stipules none; flowers perfect or unisexual, commonly terminal sometimes axillary; sepals imbricate; petals imbricate or contorted; stamens usually numerous, free or united in fascicles; ovary with 3–5 or sometimes 15 carpels; fruit capsular, baccate, or drupaceous.

CALOPHYLLUM L.

Calophyllum brasiliense Camb. var. **Rekoi** Standl. *María, Santa María, María colorado.* Common in forests of the tierra caliente, ascending at San Ramón to 1,100 meters. The variety ranges from Mexico to Panama, and the species to Brazil. A tall or medium-sized tree, glabrous; leaves obovate or oblong, obtuse, very thick and coriaceous, lustrous, short-petiolate, with very numerous parallel, lateral nerves; flowers small, yellowish, in short, axillary racemes; ovary 1-celled; fruit a large, yellowish drupe, 1-seeded. The wood is pink or reddish, usually with dark veins, moderately hard and heavy, strong, and of medium texture. It is much used in some regions for construction of various kinds. Costa Rican collections have been referred to *C. Calaba* Jacq. and *C. lucidum* Benth. The vernacular name is believed to be of Indian (Carib?) origin, and to have no relation to the Spanish word María.

CLUSIA L.

Glabrous trees or shrubs, often epiphytic, especially in their young state, the sap resinous and yellowish; leaves coriaceous, sometimes very thick, with numerous lateral nerves, short-petiolate or sessile; flowers terminal, small or large, white, dioecious or polygamous; sepals 4–5, rounded; petals 4–9; stamens numerous; ovary 5–12-celled; fruit a fleshy or coriaceous capsule, dehiscent, the seeds numerous, arillate.—Other species occur in Central America. The plants of this genus are similar in habit to those of the genus *Ficus*, usually beginning their existence as epiphytes, but in time, by means of aerial roots that penetrate the soil, becoming fixed in the ground. They become small or medium-sized trees, often of handsome aspect, except as deformed by the great mass of smaller epiphytes that they often harbor.

Clusia alata Planch. & Triana. *Azahar, Azahar de monte.* Mountains near Fraijanes and San Isidro de Heredia; Guanacaste; region of San Ramón. Extending to Colombia. An epiphytic shrub, sometimes a tree; leaves obovate or rounded-obovate, 8–11 cm. long or more, very thick, broadly rounded at the apex, the nerves oblique but divergent at a rather wide angle, the petiole very short and broadly winged; fruits about 3 at the apex of the branch.

Clusia flava Jacq. *Copey, Copeicillo.* Forests of the Atlantic tierra caliente and in the region of Dota, ascending to 1,800 meters; San Ramón. Ranging to Mexico and the Antilles. A shrub or tree; leaves petiolate, obovate-cuneate, 10–17 cm. long, not very thick, broadly rounded at the apex, the lateral nerves very oblique, the petiole not winged; capsule ovoid, 2 cm. long or larger.

Clusia gracilis Standl., sp. nov.—Frutex epiphyticus gracillimus, internodiis elongatis, omnino glaber; folia parva graciliter petiolata subcoriacea, petiolo 1.5–2 cm. longo nudo; lamina lanceolato-oblonga vel elliptico-oblonga 8–10 cm. longa 3–4 cm. lata acuta vel acuminata basi acuta, nervis lateralibus utrinque prominulis et manifestis gracillimis utroque latere ca. 15 angulo semirecto adscendentibus; inflorescentia ut videtur laxa et pluriflora, ramis fructiferis valde elongatis et pendulis usque ad 5 cm. longis gracilibus, bracteis parvis rotundatis vix 2 mm. longis patentibus; bracteolae 2 ca. 2 mm. longae; sepala 6 inaequalia, exterioribus semiorbicularibus 4 mm. longis, interioribus decussatis late ovalibus 7 mm. longis apice late rotundatis; capsula ovalis vel subglobosa 4 cm. longa.—Near Guápiles, Prov. Limón, 300–500 meters, *Standley*

37142 (type in U. S. Nat. Herb.). The species is well marked by the small, almost membranaceous leaves, and by the elongate fruiting pedicels.

Clusia oblanceolata Rusby. In dense forest on ridge between Rivas and Chirripó Grande, *Ralph E. Danforth 40*. Also in Colombia. A medium-sized tree; leaves narrowly oblanceolate, mostly 14–17 cm. long, acute or rather abruptly short-acuminate, long-attenuate to the almost sessile, winged base, subcoriaceous; flowers small, rather numerous, corymbose.

Clusia odorata Seem. *Azahar, Azahar de monte, Copey. C. uvitana* Pittier, Contr. U. S. Nat. Herb. 13: 452. 1912 (Isla Uvita near Limón, *Pittier 12704*). Common in forests of the Atlantic slope, ascending to 1,800 meters; Guanacaste; San Ramón. Central America and Colombia. A tree or shrub, epiphytic or terrestrial; leaves not very thick, short-petiolate, obovate, obtuse or acute at the apex, acute at the base, the nerves very oblique and slender, commonly 6–10 cm. long, the petiole not winged; pistillate flowers 5–9 or more, small; capsule oval or oblong, 2–2.5 cm. or more in length. Some of the specimens have been referred to *C. minor* L., from which *C. odorata* may not be distinct. Indian names are: Tispa (Guatuso); Seré (Térraba); Aréng-krá (Brunka). About this tree Pittier writes: "The yellow latex that exudes from all parts of the tree is used in various ways by our country people, sometimes as a strong purgative or in combination with other substances as an unguent for treating sores, also for caulking boats. The flowers are highly esteemed for their odor, preserved even when they are dry, and they are the basis of a tea that is administered for affections of the chest." The flowers have an odor similar to that of orange blossoms, hence the name Azahar.

Clusia palmana Standl., sp. nov.—Arbor vel frutex epiphyticus glaber ad 6 m. altus, ramulis crassis; folia mediocria breviter petiolata tenuiter coriacea, petiolo 5–10 mm. longo late alato basi dilatato; lamina ovali-obovata 8–13 cm. longa 4.5–7 cm. lata apice rotundata, basin versus breviter cuneato-angustata, supra sublucida, nervis lateralibus utroque latere ca. 30 angulo lato interdum fere recto divergentibus juxta marginem in nervum collectivum conjunctis; flores feminei 3 terminales fere sessiles; sepala late rotundata, interioribus 5 mm. longis; capsula ovoideo-ovalis 2 cm. longa 1.5 cm. lata apice subtruncata 5-locularis.—La Palma, Prov. San José, in a meadow, 1,600 meters, *Standley 32906* (U. S. Nat. Herb., type);

also *No. 38060* from the same locality; Cerro de Las Caricias, near San Isidro de Heredia, 2,000–2,400 meters, *Standley & Valerio 52338;* La Hondura, Prov. San José, 1,300–1,700 meters, *Standley 36257.* Distinguished by the form of the leaves, which are rather thin, their nerves not very oblique.

Clusia rosea Jacq. Cocos Island; Guanacaste; region of San Ramón. Probably in various parts of the coasts. Mexico to the Antilles and northern South America. A medium-sized or small tree; leaves almost sessile, rounded-obovate, 7–15 cm. long, very thick, broadly rounded at the apex, broadly cuneate or rounded at the base; petals 6, white or pink; fruit 5–6 cm. in diameter, 8–12-celled.

Clusia rotundata Standl., sp. nov.—*Copey.* Arbor 9-metralis, ramulis crassissimis; folia parva breviter petiolata crasse coriacea, petiolo crassissimo 5–8 mm. longo alato; lamina suborbicularis, ovalis vel rotundato-obovata 5.5–9 cm. longa 3.5–6.5 cm. lata apice late rotundata basi rotundata vel obtusissima, nervis lateralibus supra manifestis sed tenerrimis utroque latere ca. 12, subtus obsoletis, marginibus plus minusve corneo-incrassatis; inflorescentia terminalis triflora breviter crasse pedunculata, floribus sessilibus; sepala 4 lata rotundata in alabastro fere 1 cm. longa.—Oak forest near Quebradillas, 7 km. north of Santa María de Dota, Prov. San José, 1,800 meters, *Standley 43107* (type in U. S. Nat. Herb.); Laguna de La Escuadra, in the same region, 2,000 meters, *Standley 41980.* Easy to recognize because of its small, almost orbicular leaves.

Clusia Salvinii Donn. Smith. La Hondura, 1,300–1,700 meters. Extending to Mexico. A tree of 6 meters; leaves petiolate, large, obovate-oblong, rounded or very obtuse at the apex, somewhat narrowed toward the acute base, thick, the petiole broadly winged; pistillate inflorescence with 3 sessile flowers; capsule globose.

From the Atlantic coast there has been reported *C. Seemannii* Planch. & Triana, a Panama species, but I have seen no Costa Rican collection of it.

Clusia Torresii Standl., sp. nov.—Frutex 3-metralis glaber, ramis ochraceis vel griseis gracilibus; folia parva petiolata subcoriacea, petiolo 6–10 mm. longo; lamina anguste oblongo-oblanceolata 4.5–9.5 cm. longa 1–2 cm. lata apicem obtusum vel subrotundatum versus paullo angustata, basin versus longe sensim attenuata,

subtus in sicco brunnescens, nervis lateralibus utrinque prominulis teneris valde obliquis; pedunculus terminalis simplex gracilis 2.5 cm. longus bracteis 2 onustus; sepala 4 decussata 7 mm. longa ovali-rotundata apice late rotundata; fructus ovalis 4.5–5 cm. longus 3 cm. latus basi late rotundatus apice rotundato-obtusus.—El Muñeco, Río Navarro, Prov. Cartago, 1,400 meters, *Standley & Rubén Torres Rojas 51221* (type in U. S. Nat. Herb.). A species easily recognized because of the small and very narrow leaves.

Clusia Valerii Standl., sp. nov.—Ramuli crassi fusci; folia mediocria petiolata firme coriacea, petiolo crasso 2–2.5 cm. longo nudo; lamina oblongo-obovata 13–17 cm. longa 6–8 cm. lata apice anguste rotundata basin versus cuneato-angustata, in sicco nigrescens, nervis lateralibus numerosissimis utrinque prominulis teneris, costa crassa subtus valde elevata; sepala ca. 8 imbricata ovali-rotundata, interioribus 12 mm. longis; capsula ovalis 3 cm. longa 2 cm. lata 4-valvis.—Buenos Aires, Cantón de Osa, 480 meters, *Manuel Valerio 851* (type in Herb. Field Mus.). Although known only from imperfect material, this plant appears to be quite distinct from all the species of *Clusia* previously known from Central America.

HYPERICUM L. St. Johnswort

Glabrous shrubs or herbs; leaves small, entire, usually black-punctate, narrow, sessile; flowers yellow, small or large, solitary or cymose; sepals somewhat unequal; petals often black-punctate; stamens few or numerous, usually united in several fascicles; styles 3–5; fruit a capsule with 1 or 3–5 cells, the seeds numerous.—There probably are a few other species in Central America.

Hypericum Ascyron L. A small ornamental shrub of gardens. Native of the United States.

Hypericum caracasanum Willd. is reported from Costa Rica by Keller, but I have seen no specimens. It is a South American species that may exist in the highest meadows of Costa Rican volcanoes.

Hypericum gnidioides Seem. Oak forests of the region of Santa María de Dota. Panama. An erect, perennial herb, 15–25 cm. high; leaves linear, erect, their margins revolute; flowers small.

Hypericum laricifolium Juss. is reported for Costa Rica by Keller, and it may occur in the paramos. It is very similar to *H. strictum* HBK., but has shorter leaves.

Hypericum longibracteatum Keller, Bot. Jahrb. 58: 198. 1923. Roadsides between San Ramón and San Onateo, Río Jesús, 600–800

meters, *Brenes 14513*. An annual, probably not distinct from *H. uliginosum*.

Hypericum silenoides Juss. *Culantro cimarrón* (Oersted). *H. irazuense* Kuntze, Rev. Gen. 1: 61. 1891 (Volcán de Irazú, *Kuntze*). Meadows of Irazú and Turrialba, and in the paramos of the mountains of Dota, at 2,000–3,000 meters. Extending to the South American Andes. A shrub of 1–3 meters, densely branched; branches densely leafy, the leaves lance-oblong, acute, 5–14 mm. long, 1-nerved; flowers large, terminal and solitary, the petals 1.5 cm. long. Costa Rican specimens have been referred to *H. stenopetalum* Turcz.

Hypericum strictum HBK. Meadows and paramos of Poás and the mountains of Dota; Alto del Abejonal; sometimes growing in sphagnum bogs; at 2,000-3,000 meters. Also in the Andes of South America. A densely branched shrub, about 30 cm. high; branches densely leafy, the leaves linear or acicular, ascending, 5-8 mm. long; flowers few, terminal, the petals 1 cm. long. The Costa Rican plant has been referred to *H. struthiolifolium* Juss.

Hypericum uliginosum HBK. *H. uliginosum* var. *erectum* Keller, Bull. Herb. Boiss. II. 8: 191. 1908 (type collected by Tonduz). Common in grassy places throughout the central region, 1,000–2,400 meters; San Ramón. Mexico to South America. An erect annual or perennial 20–60 cm. high, with few branches; leaves oblong to linear, ascending or divergent; flowers small, few or numerous, in sparsely branched, terminal cymes. The Costa Rican plant has been referred to *H. thesiifolium* HBK., and it is probable that other references to *H. fastigiatum* HBK., *H. Schaffneri* Wats., and *H. pauciflorum* HBK. relate to *H. uliginosum*. It is possible that the material examined by the writer does represent several species, but I have been unable to find any definite characters by which they may be separated. It is certain that in this group of *Hypericum* the species have been multiplied ridiculously.

MAMMEA L.

The genus consists of a single species.

Mammea americana L. *Mamey*. Often planted in the tierra caliente as a fruit tree, possibly native in some regions, but more probably introduced. Widely distributed in tropical America in cultivation. A tall or medium-sized tree; leaves oval, short-petiolate, rounded at the apex; flowers large, white; fruit oval, 10–15 cm. long, the flesh yellow, sweet, edible. The tree is highly valued in some re-

gions for its agreeably flavored fruit, which reminds one, by the appearance and flavor of its flesh, somewhat of a peach. The wood is white, hard, of medium weight, and employed sometimes for construction. Indian names are Tshep (Brunka); Shru (Térraba).

MARILA Swartz

Another species of the genus is known from Panama.

Marila verapazensis Donn. Smith. Reported as collected in El General by Skutch. Also in Guatemala. A shrub or small tree; leaves oblong, coriaceous, acutely cuspidate, glabrous above, punctulate beneath and puberulent on the nerves, acutish at the base, 18–20 cm. long; flowers racemose, the racemes axillary, as long as the leaves, puberulent; sepals deflexed after anthesis, 7–8 mm. long, the petals 9 mm. long; fruit capsular.

RHEEDIA L.

Rheedia edulis Triana & Planch. *Jorco.* Forests of the tierra caliente; region of San Ramón. Mexico to Panama. A glabrous tree, sometimes 30 meters high; leaves petiolate, coriaceous, narrowly oblong-lanceolate, 5–15 cm. long, acuminate, acute at the base, with numerous lateral nerves; flowers small, axillary or lateral, long-pedicellate, the petals whitish, 6–7 mm. long; fruit yellow, smooth, as large as a lime, of agreeable flavor, 1-seeded. A handsome tree, often planted in Central America for ornament or shade, or for its fruits, which, however, have little to recommend them. The not very hard wood is employed for construction, especially because it is not subject to insect attacks.

Rheedia Tonduziana Engler, Bot. Jahrb. 58, Beibl. 130: 10. 1923. Río Virilla, near San Juan, 1,100 meters, *Tonduz 11249.* I have seen a photograph of the type of this species, which is probably nothing more than a form of *R. edulis.* Other species of *Rheedia* occur in Panama, and some of them may extend to Costa Rica.

SYMPHONIA L. f.

A single species occurs in North America.

Symphonia globulifera L. f. *Cerillo, Botoncillo.* Common in forests of the tierra caliente, ascending the mountains of the central region to 2,400 meters. Central America to Brazil. A tall tree, as much as 18 meters or more in height, glabrous; leaves small, short-petiolate, not very thick, acuminate, acute at the base, with numer-

ous slender lateral nerves; flowers reddish, umbellate at the ends of the branches, the petals incurved and concave; fruit ovoid, 1.5–2 cm. long, 1-seeded, the outside brownish. The wood is greenish brown or gray, rather hard and heavy, and apparently durable. In some regions it is employed for construction. From the bark there exudes a yellow latex that coagulates as a kind of wax, used by the Indians for candles and for caulking their boats (Pittier).

TOVOMITA Aubl.

Another Central American species is found in Panama.

Tovomita Pittieri Engler, Bot. Jahrb. 58, Beibl. 130: 8. 1923. Near Tuis, 1,000 meters, *Pittier 16094*. A glabrous tree; leaves petiolate, almost orbicular, 20 cm. long and 18 cm. wide, coriaceous, rounded at the apex; flowers paniculate, the panicles arising from defoliate branches, 3 cm. long; sepals 4, 1–3 mm. long; petals 2; ovary 4–5-celled.

TOVOMITOPSIS Planch. & Triana

Shrubs or small trees, glabrous or sometimes pubescent in the inflorescence; leaves opposite, membranaceous, petiolate, the lateral nerves few and distant; inflorescence terminal, many-flowered, paniculate, the flowers small, polygamo-dioecious; sepals 4, the outer ones smaller; petals 4; stamens numerous; ovary 4–5-celled; fruit fleshy, 4–5-valvate, containing 4 or 5 large seeds.—It is probable that there are one or two other species in Central America. The Costa Rican species are all much alike, and it may well be that not all are distinct. It seems probable that it might be better to refer all the species of this group to *Chrysochlamys*, as was done by Bentham and Hooker.

Tovomitopsis costaricana Oersted ex Triana & Planch. Ann. Sci. Nat. IV. 14: 265. 1860. *Chrysochlamys costaricana* Hemsl. Biol. Centr. Amer. Bot. 1: 87. 1879. Turrialba, *Oersted 3588*. Common in the tierra caliente, to 1,500 meters; Guanacaste; region of San Ramón; growing in wet forest. A shrub or tree of 2–6 meters; leaves short-petiolate, oblanceolate-oblong, 12–19 cm. long, short-acuminate, narrowed to the base; panicles very large, the numerous flowers pedicellate, the buds 2.5 mm. long; petals white or somewhat yellowish; fruits oblong, almost 3 cm. long, somewhat angulate, short-rostrate.

Tovomitopsis glauca Oerst. ex Planch. & Triana, Ann. Sci. Nat. IV. 14: 264. 1860. *Chrysochlamys glauca* Hemsl. Biol. Centr.

Amer. Bot. 1: 87. 1879. Type collected in Costa Rica by Oersted, *No. 3589*, without indication of the locality. Common in the mountains of Guanacaste, 600–700 meters. Endemic. A shrub of 2–3 meters, glabrous; leaves smaller than in other species, generally 5–10 cm. long, narrow-acuminate; flower buds 3.5 mm. long; panicles short but many-flowered; petals yellowish white; fruits obovoid, reddish, about 2 cm. long.

Tovomitopsis nicaraguensis Oerst. Common in forests of the Atlantic tierra caliente, ascending to 1,400 meters; region of San Ramón. Central America. A shrub or tree of 2–6 meters; leaves large, usually 15–25 cm. long, acute or short-acuminate, when dry somewhat brown beneath; panicles large or small, the flowers white or reddish, the buds 3.5 mm. long; fruits red, obovoid or subglobose, 1.5–2 cm. long.

Tovomitopsis psychotriaefolia Oerst. ex Planch. & Triana, Ann. Sci. Nat. IV. 14: 263. 1860. Turrialba, *Oersted 3585*. Common in forests of the central region, 600–1,600 meters; region of San Ramón. Endemic. A shrub or tree of 3–7 meters, usually puberulent in the inflorescence but glabrous elsewhere; leaves mostly 8–15 cm. long, acute or short-acuminate; panicles small or large, with numerous white flowers, the buds 5–6 mm. long. Flowers larger than in the other species. By Engler the species is referred to *Chrysochlamys*, but to the writer it appears certainly congeneric with the other Costa Rican species, in whatever genus they may be placed.

VISMIA Vandelli

In Panama there are found five species of this genus, some of which extend to northern Central America, and additional ones may occur in Costa Rica.

Vismia ferruginea HBK. Region of El General, and probably elsewhere at low or middle elevations. Extending to northern South America. Similar to the following species, but the flowers larger, the mature sepals 9–10 mm. long; tomentum of the leaves coarse, abundant, not appressed, brownish.

Vismia guianensis (Aubl.) Pers. *Achotillo, Palo de Mayo* (?). Common in mountains and valleys of the central region, ascending to 2,000 meters; also in the Atlantic coast; San Ramón. Mexico to Brazil. A shrub or tree, sometimes 9 meters high, often forming almost pure stands of considerable extent; leaves petiolate, ovate or lanceolate, acuminate, rounded or obtuse at the base, green above,

beneath whitish or brownish and covered with a fine tomentum; flowers yellowish, in terminal cymes; sepals 5–7 mm. long; petals somewhat pilose within and with black lines; fruit a black berry containing numerous small seeds. Costa Rican specimens have been referred to *V. panamensis* Duchass. & Walp., *V. ferruginea* HBK., and *V. mexicana* Schlecht., but all the numerous ones that I have seen seem to represent a single, not especially variable species. It is somewhat surprising that a tree of the coast should be found also in regions as high as those of Dota or La Hondura de San José, but a like distribution is found in the case of some other trees. Pittier notes that the sap of *V. guianensis* is employed for curing skin affections. Indian names are Gurak, Srin-gró (Térraba); Hunkri-krá (Brunka).

CISTACEAE. Rock Rose Family

The genus *Lechea* is represented in northern Central America.

HELIANTHEMUM Mill.

A single species is known from Central America.

Helianthemum glomeratum Lag. *Halimium glomeratum* Grosser. Meadows and paramos of the central region, 1,500–2,000 meters. Extending to Mexico. A perennial herb, densely tomentose with stellate hairs, erect, 25–50 cm. tall, branched above the middle; leaves alternate, without stipules, short-petiolate, oblanceolate or spatulate, 1–3 cm. long, entire; flowers axillary or in terminal glomerules, small, yellow, some of them apetalous, with 5 sepals and 5 petals; stamens numerous; fruit a 3-valvate capsule, containing numerous seeds.

BIXACEAE. Anatto Family

BIXA L. Anatto

Bixa Orellana L. *Achiote.* Common in thickets and open forests of the Pacific slope, ascending to 800 meters, and cultivated or naturalized in many other regions. Generally distributed in tropical America. A shrub or small tree, well known in all regions of America. It is a highly variable plant, especially in the size of the flowers and form of the capsules, which are globose or ovoid, and either smooth or covered with long, flexible prickles. The plant has been cultivated in Central America probably from ancient times for the yellowish red dye extracted from the pulp that covers the seeds. The dye was used by the native people for coloring their bodies, partly for decoration and partly to prevent insect bites, and also for dyeing clothing and other articles. At the present time it is em-

ployed for coloring butter, certain kinds of cheese, and textiles, both in Central America and in Europe and North America. In Central America its most conspicuous use is for coloring rice, which here almost always comes upon the table with a reddish tint, rather than merely white. The wood is pinkish yellow, soft, porous. The bark contains a strong fiber. The specific name commemorates the celebrated discoverer of the Amazon, Don Francisco Orellana. Indian names listed are; Katshá (Bribrí), Krikrá (Brunka), Shon-guó (Térraba), So (Guatuso).

COCHLOSPERMACEAE. Poroporo Family

COCHLOSPERMUM Kunth

A single species occurs in North America.

Cochlospermum vitifolium (Willd.) Spreng. *Poroporo.* Common in thickets and forests of the Pacific slope, ascending to 1,000 meters. Mexico to northern South America. A deciduous shrub or tree, often flowering when only a meter high; leaves long-petiolate, alternate, deeply 5-lobate, cordate at the base, the lobes serrate, almost glabrous; flowers bright yellow, resembling roses, 10 cm. broad, with 5 sepals and petals and numerous large stamens; fruit a 5-valvate capsule, 7–8 cm. long, pubescent, the numerous seeds reniform, covered with long hairs resembling cotton fiber. The wood is soft and spongy. The tree loses its leaves during the dry season, and at that time becomes covered with its very showy and beautiful flowers. The tree is often employed for hedges. Pittier reports that if a hole is made in the trunk and filled with water, after a few hours there is obtained a liquid that is considered a sovereign remedy for jaundice. Indian names reported are: Poroporo (Cabécara), Minkra (Brunka), Bing-ua (Térraba), Poolun (Guatuso).

VIOLACEAE. Violet Family

Herbs or shrubs, sometimes small trees; leaves generally alternate, stipulate, entire or dentate; flowers regular or irregular, with 5 sepals and 5 petals; stamens 5; ovary 1-celled, the ovules solitary or numerous; fruit a 3-valvate capsule.—Other genera are represented in Central America.

AMPHIRRHOX Spreng.

A single species is found in North America.

Amphirrhox longifolia Spreng. Forests of the Atlantic coast. Extending to Brazil. A shrub or tree of 3–10 meters, glabrous;

leaves oblong-lanceolate or obovate-oblong, acuminate, narrowed to the base, remotely serrate; flowers yellowish, almost 2 cm. long, cymose, the inflorescences pedunculate, clustered at the apex of the branch; petals almost equal, none of them spurred; fruit a 3-valvate capsule.

HYBANTHUS Jacq.

Herbs or shrubs; leaves alternate or almost opposite, membranaceous; flowers small or medium sized, solitary or clustered; petals unequal; stamens united; capsule elastically 3-valvate.

Hybanthus anomalus (HBK.) Melchior. *Ionidium anomalum* HBK. Forests of Santo Domingo de Golfo Dulce. Guatemala (?) to Colombia. A shrub of 1–3 meters; leaves lanceolate or elliptic-oblong, 6–10 cm. long, narrow-acuminate, serrate, almost glabrous; flowers white, 3–4 cm. long.

Hybanthus costaricensis Melchior in Engl. & Prantl, Pflanzenfam. ed. 2. 21: 359. 1925. Type, *Brade 2526*, without indication of the locality. A shrub, thé leaves very small, spatulate, serrate, obtuse or rounded at the apex; flowers solitary in the leaf axils. As yet, no description has been published of this species. I have seen a photograph of the type, from which it is possible to see that the species represented is a distinct one, especially because of its very small leaves, shorter than the internodes of the branches.

Hybanthus guanacastensis Standl. Journ. Wash. Acad. Sci. 17: 168. 1927. Moist forest, Los Ayotes, near Tilarán, Guanacaste, 700 meters, *Standley & Valerio 45423*. Mountains of the region of the type, also Cerro de Aguacate. Nicaragua. A shrub of 1.5–4.5 meters; leaves short-petiolate, oblong to oblong-elliptic, 4–10 cm. long, acute or acuminate, serrate, glabrous; flowers solitary in the leaf axils, 6 mm. long, greenish.

Hybanthus occultus (Polak.) Standl., comb. nov. *Ionidium occultum* Polak. Linnaea 41: 548. 1877. Forests of Cerro de La Carpintera, *Polakowsky 181*. Forests of the central region. Also probably in Mexico. A shrub a meter high; leaves elliptic-oblong to ovate-oblong, 4–8 cm. long, acute or obtuse, crenulate, glabrous; flowers 8 mm. long, solitary in the leaf axils; capsule 1 cm. long. It is probable that *H. nigricans* (Dowell) Standl., of Mexico, is a synonym of this species.

Hybanthus oppositifolius (L.) Taubert. *H. riparius* (HBK.) Standl. Pastures and other grassy places, Meseta Central to the Pacific coast. Widely distributed in tropical America. A slender

annual, erect, simple or somewhat branched; leaves small, lanceolate, short-petiolate, somewhat serrulate, narrow-acuminate, sparsely pubescent or glabrous; flowers solitary in the leaf axils, small, white or greenish.

RINOREA Aubl.

Reference: Blake, Contr. U. S. Nat. Herb. 20: 491. 1924.

Shrubs or small trees; leaves short-petiolate, crenulate, alternate or opposite; flowers small, white or greenish, paniculate or in axillary racemes; petals almost equal; fruit capsular.

Rinorea crenata Blake, Contr. U. S. Nat. Herb. 20: 500. 1924. Forests of Shirores, Talamanca, 100 meters, *Pittier & Tonduz 9183*. Leaves alternate, oblong-obovate, 8–13 cm. long, short-acuminate, glabrous except for being puberulent beneath on the costa; flowers in panicles 4 cm. long, the petals 3 mm. long.

Rinorea pubipes Blake, Contr. U. S. Nat. Herb. 20: 515. 1924. Hacienda de Zent, Atlantic coast, *Pittier*. Forests of the Atlantic coast. Nicaragua. Leaves opposite, oblong-elliptic or obovate-elliptic, acuminate, puberulent and pilose beneath on the costa and nerves; flowers racemose.

Rinorea squamata Blake. Río Hondo. Panama. A small tree of 5 meters; leaves opposite, elliptic-obovate, 7–10 cm. long, narrow-acuminate, almost glabrous; flowers racemose, the petals 3.5 mm. long.

Rinorea sylvatica (Seem.) Kuntze. Changuinola Valley. Panama and Colombia. A shrub or small tree; leaves opposite, obovate, 6–12 cm. long, narrow-acuminate, somewhat puberulent; flowers racemose, the petals 5 mm. long; capsule 2 cm. long.

VIOLA L. Violet

Reference: W. Becker, Repert. Sp. Nov. 19: 392; 20: 1. 1924.

Perennial herbs, acaulescent or with elongate stems, sometimes scandent; leaves petiolate; stipules conspicuous; flowers small or large, the petals unequal, one of them produced into a spur; fruit a small capsule.—Other species occur in Central America.

Viola Nannei Polak. Linnaea 41: 547. 1877. *Violeta*. Pastures of Cerro de La Carpintera, *Polakowsky 165*. Common in pastures of the central mountains, 1,600–3,000 meters. Endemic. Plants small, acaulescent, the leaves reniform; petals bluish purple. The

species was named in honor of Wilhelm Nanne, manager of the Ferrocarril de Costa Rica. The plant is similar to the sweet violet of gardens. It has been reported from Costa Rica as *V. Hookeriana* HBK.

Viola odorata L. *Violeta.* The sweet violet, native of Europe, is a common garden plant of Costa Rica.

Viola scandens Willd. Common in forests of the central mountains, at 1,800–3,000 meters. Mexico to Ecuador. Plants prostrate or clambering, the stems often greatly elongate; leaves long-petiolate, ovate, somewhat cordate at the base, crenate, acute or obtuse; flowers white with veins of purple. Reported for Costa Rica under the name *V. Lindeniana* Turcz.

Viola stipularis Swartz. Common in forests of the central region, descending to Las Vueltas de Tucurrique, at 1,000–1,700 meters. Ranging to Peru and the West Indies. Plants prostrate or scandent, the stems elongate; leaves short-petiolate, oblong or lanceolate, acuminate, acute at the base, serrulate or almost entire; corolla white, the throat purple.

Viola tricolor L. *Pensamiento.* The pansy, native of Europe, is one of the common plants of Costa Rican gardens.

FLACOURTIACEAE. Flacourtia Family

Shrubs or trees, sometimes armed with spines; leaves alternate, simple, dentate or entire, often with transparent dots or lines; stipules generally deciduous; flowers small or large, perfect or unisexual, commonly cymose, sometimes solitary or fasciculate in the leaf axils; petals present or none, stamens usually more numerous than the petals; ovary 1-celled, with 3–5 placentas; fruit usually baccate or capsular, with few or numerous seeds.

ABATIA Ruiz & Pavón

A single species occurs in Central America. Another is found in Mexico.

Abatia parviflora Ruiz & Pavón. Known in Costa Rica only from Cerro de Las Vueltas, at 3,000 meters, where it is common. Ranging to Peru. A tree of 5–7 meters; leaves large, lance-oblong, narrow-acuminate, rounded at the base, serrulate, densely stellate-tomentose beneath; flowers small, greenish yellow, in elongate, dense racemes; petals none; stamens numerous; fruit capsular.

ABERIA Hochst.

Aberia caffra Hook. f. & Harv. Cultivated at San José. Native of South Africa. A shrub, densely armed with long, stout spines; leaves obovate, short-petiolate, entire, obtuse or rounded at the apex, cuneate at the base; flowers small, dioecious, apetalous; fruit juicy, globose, acid. Known as the kei apple, this plant is grown in some regions for hedges, also for its fruit, used for making pickles and preserves.

BANARA Aubl.

Banara guianensis Aubl. Forests and thickets of the tierra caliente. Ranging to northern South America. A shrub or tree, as much as 8 meters high; leaves short-petiolate, oblong or ovate, acuminate, serrate, rounded to acute at the base, almost glabrous above, densely pilose beneath; flowers small, white, in terminal panicles, with petals; fruit small, fleshy, indehiscent. The species is a variable one, especially in pubescence. In the Copenhagen herbarium Oersted has indicated two new species, still unpublished, but apparently they are only forms of *B. guianensis*.

CARPOTROCHE Endl.

Trees or shrubs, with few branches; leaves alternate, long and narrow, entire or serrate; stipules caducous; flowers large or small, white, the staminate in axillary racemes, the pistillate generally solitary; sepals 2 or 3; petals 4–12; ovary 1-celled, with 4–8 placentae; fruit a large, coriaceous or woody capsule, indehiscent, with several broad, longitudinal wings; seeds numerous, surrounded by pulp.—Another Central American species is found in Panama.

Carpotroche crassiramea Pittier, Contr. U. S. Nat. Herb. 12: 180. *f. 17, 18.* 1909. Forests of Río Banana, near Limón, *Cook & Doyle 424.* Forests of the Atlantic coast. Also in Panama. A shrub of 2 meters; leaves oblong-obovate, 30–65 cm. long, rounded to acute at the apex, narrowed toward the base, remotely dentate, somewhat pubescent beneath; fruit 3.5 cm. long, with 10 wings. Probably a mere form of *C. platyptera.*

Carpotroche glaucescens Pittier, Contr. U. S. Nat. Herb. 12: 178. *f. 14.* 1909. "Grape Point," coast of Talamanca, *Pittier 14089.* A shrub of 1.5 meters; leaves pale, short-petiolate, oblong-obovate, 40 cm. long, narrow-acuminate, glabrous, serrate with very acute teeth; capsule 8–10-winged.

Carpotroche platyptera Pittier, Contr. U. S. Nat. Herb. 12: 178. *pl. 19.* 1909. *Caraña.* Río Hondo, Llanuras de Santa Clara, *Pittier 16634.* Common in forests of the Atlantic tierra caliente. Honduras to Panama. A shrub or tree of 2–5 meters, simple or branched; leaves oblong-oblanceolate, as much as 60 cm. or probably more in length, serrate, pubescent or almost glabrous beneath, acuminate; flowers greenish white; capsules 5 cm. long or larger, globose, reddish, 8-winged. A characteristic species of the coastal forests of many parts of Central America.

CASEARIA Jacq.

Shrubs or small trees; leaves entire or dentate, almost always with translucent dots or lines; flowers small, white or greenish, fasciculate or umbellate in the leaf axils, apetalous; stamens usually 6–15; fruit capsular, dry or fleshy, 3–4-valvate; seeds few or numerous, subtended by a fleshy aril.—Other species occur in Central America.

Casearia aculeata Jacq. *Matacartago. C. nicoyensis* Donn. Smith, Bot. Gaz. 49: 454. 1910 (Nicoya, *Tonduz 13901*). Common in forest and thickets of the Pacific tierra caliente. Widely distributed in tropical America. A shrub or small tree of 2–7 meters, the branches often spiniform; leaves short-petiolate, elliptic or obovate, sometimes oblong, usually 6–9 cm. long, crenate or almost entire, obtuse to acuminate, glabrous; flowers whitish, fasciculate in the leaf axils, pubescent. It is possible that the Costa Rican collections represent two distinct species.

Casearia arborea (Rich.) Urban. Forests and thickets of the Atlantic coast. Central America to the Antilles and Brazil. A shrub or tree of 3–6 meters; leaves short-petiolate, narrowly oblong, narrow-acuminate, acute or obtuse at the base, finely serrulate, almost glabrous; flowers white, in small, short-pedunculate cymes; capsule red, 1 cm. long, 3-angulate.

Casearia arguta HBK. *Huesillo, Palo María, Puipute. C. Fockeana* Miq. Common in forests and thickets of the tierra caliente. Widely distributed in tropical America. A shrub or small tree, sometimes 7 meters high, unarmed; leaves lance-oblong, acuminate, serrate, densely or sparsely pilose beneath; flowers white, fasciculate in the leaf axils, pubescent, the pedicels short; capsule globose, 1 cm. broad. In Panama the plant is called Raspa-lengua. At least some

of the Costa Rican collections reported under the name *C. parvifolia* Willd. are referable to this species.

Casearia Commersoniana Camb. Golfo Dulce. Mexico to Brazil. A species similar to *C. javitensis*, but the umbels few-flowered; capsule glabrous.

Casearia decandra Jacq. El Muñeco; region of San Ramón, at 1,050 meters. West Indies. A glabrous shrub or tree; leaves small, lance-oblong, acuminate, serrulate, acute at the base; flowers fasciculate in the leaf axils, greenish white, small.

Casearia guianensis (Aubl.) Urban. Forests of the coasts. Widely distributed in tropical America. A small, unarmed tree; leaves large, almost sessile, oblanceolate-oblong, mostly 13–20 cm. long, narrow-acuminate, narrowed toward the base, finely serrate or almost entire, glabrous; flowers pubescent, fasciculate in the axils, the pedicels short; capsule almost 1 cm. long.

Casearia javitensis HBK. Common in forests and thickets of the Pacific tierra caliente. Of wide distribution in tropical America. A shrub or small tree of 3–6 meters; leaves oblong or lance-oblong, thick and very coriaceous, narrow-acuminate, lustrous, serrate with very unequal teeth, glabrous; flowers white, fasciculate in the leaf axils; capsule 1 cm. long, pilose.

Casearia nitida (L.) Jacq. Frequent in thickets of the Pacific tierra caliente; Guanacaste. Widely distributed in tropical America. A shrub, or sometimes a tree as much as 10 meters high; leaves oblong or obovate, obtuse or rounded at the apex, membranaceous, pubescent or glabrous, somewhat serrulate; flowers white, in small, pedunculate cymes; capsule 3-angulate, reddish or orange.

Casearia sylvestris Swartz. Meseta Central to the coasts, abundant in many regions, in thickets and forests, to 1,800 meters. Widely dispersed in tropical America. A tree of 4–7 meters, the crown sometimes broad and depressed; leaves oblong or lance-oblong, narrow-acuminate, entire, conspicuously unequal at the base, glabrous; flowers greenish white, very small, densely fasciculate in the leaf axils; capsule 3–4 mm. long, 2–3-seeded. The most abundant species of Central America.

HASSELTIA HBK.

Trees or shrubs; leaves alternate, 3-nerved, entire or glandular-crenate; stipules deciduous; indument of simple hairs; inflorescence

terminal, cymose, few- or many-flowered; sepals 3–5, imbricate, persistent; petals as many as the sepals, persistent; stamens numerous, free, the filaments filiform; ovary 2-celled; seeds usually 1 in each cell.—One other species occurs in northern Central America.

Hasseltia costaricensis Standl., sp. nov.—Arbuscula praeter flores fere omnino glabra, ramulis teretibus gracilibus ferrugineis solemniter lenticellatis, internodiis brevibus vel elongatis; folia breviter petiolata subcoriacea, petiolo 8–12 mm. longo; lamina lanceolato-oblonga 8–15 cm. longa 3.5–5 cm. lata anguste acuminata vel subacuminata, apice ipso obtuso, basi obtusa et saepe subinaequalis, in fere toto margine grosse adpresse glanduloso-crenata, supra in sicco fuscescens sublucida, venulis prominulis, subtus paullo pallidior sublucida in axillis nervorum saepe sparse barbata, costa gracili elevata, basi breviter trinervia, nervis basalibus vix tertiam partem laminae attingentibus, supra basin pinnatinervia, nervis utroque latere 4–5 adscendentibus arcuatis prope marginem laxe conjunctis, venulis laxe reticulatis prominulis; cymae pauciflorae, floribus vix ultra 10 saepe tantum 2–4, pedicellis gracilibus circiter 1.5 cm. longis; sepala 3 late ovalia vel subrotundata 7–8 mm. longa apice rotundata vel obtusa, extus glabra intus dense pallido-sericea; petala late ovalia vel rotundata 10–11 mm. longa apice rotundata intus dense sericea; fructus 12 mm. et ultra diam.—Piedades Sur de San Ramón, 1,050 meters, November, 1929, *Brenes 11455* (type in Herb. Field Mus.). In forest, San Pedro de San Ramón, 950 meters, *Brenes 3657, 19038*. Because of the fact that the sepals are 3 rather than 4 or 5 as indicated for the genus *Hasseltia*, there is some question as to the proper generic reference of the plant, but it seems to me to be more satisfactorily referable to *Hasseltia* than to *Banara*, where otherwise, apparently, it would have to be placed.

Hasseltia floribunda HBK. Common in forests of the Atlantic tierra caliente, ascending to 1,400 meters. From Nicaragua to Ecuador. A shrub or tree, as much as 8 meters high; leaves short-petiolate, oblong to elliptic, almost glabrous, coriaceous, 3-nerved, dentate; flowers small, white, in large, terminal panicles; fruit small, globose, fleshy, indehiscent. Costa Rican collections have been referred in error to *Banara mexicana* Gray (*Hasseltia mexicana* Standl.), a species of Mexico and northern Central America. In Panama this species is called Raspa-lengua, in Nicaragua Muñeca. The wood is yellowish.

HOMALIUM Jacq.

Reference: Blake, Contr. U. S. Nat. Herb. 20: 221. 1919.

Shrubs or trees; leaves short-petiolate, coriaceous, crenate; flowers in axillary spikes or racemes; sepals united at the base and with the base of the ovary, persistent and somewhat accrescent, 6 or 7; petals 6 or 7, narrow, persistent; stamens in fascicles inserted opposite the petals; fruit a capsule, 2–5-valvate at the apex.—Other species are known from Central America. The wood is yellow or yellowish, moderately hard and heavy, strong, and durable, used in some regions for construction and cabinetwork.

Homalium eurypetalum Blake, Contr. U. S. Nat. Herb. 20: 234. 1919. Laguna de Sierpe, *Pittier 6817*. Also at Coto. Endemic in the Pacific coast. A tree 10 meters or more in height; leaves short-petiolate, elliptic, 10–14 cm. long, acute, crenate, almost glabrous; inflorescence racemose-paniculate; calyx segments 4–5 mm. long. Reported from Costa Rica under the name *H. hondurense* Donn. Smith.

HYDNOCARPUS Gaertn.

Hydnocarpus Kurzii (King) Warb. This tree, native of southeastern Asia, has been planted in the finca of the United Fruit Company at Guápiles, and probably in other parts of the country. From its seeds is obtained chaulmoogra oil, which has given good results in the treatment of leprosy.

The genus *Laetia* probably is represented in Costa Rica, since it is found in Panama and more northern regions of Central America.

LINDACKERIA Presl

A single species is known from Central America.

Lindackeria laurina Presl. *Hugro. Oncoba laurina* Warb. Forests of the tierra caliente. Mexico to Colombia. A tree of 6–15 meters, the bark gray; leaves coriaceous, very long-petiolate, oblong to ovate, 12–30 cm. long, acuminate, obtuse or rounded at the base, glabrous; flowers small, white, in paniculate racemes at the tips of the branches; petals 5; stamens numerous, free; capsule globose, 1 cm. broad, covered with long spines, 1–4-seeded, the pulp red. The wood is hard, heavy, and yellow.

LOZANIA Mutis

Reference: L. B. Smith, Phytologia 1: 138. 1935.

The genus contains five other species, one in Panama, the others South American.

Lozania montana Standl., sp. nov.—Frutex gracilis vel arbuscula 5-metralis, ramulis plus minusve flexuosis, novellis sparse breviter strigosis; folia crasse membranacea petiolata, petiolo 9–12 mm. longo; lamina anguste oblongo-lanceolata 6–11.5 cm. longa 1.5–3.5 cm. lata longe anguste attenuato-acuminata, acumine ipso obtuso, basi acuta vel subobtusa, arcte argute serrata, supra glabra, nervis venisque prominulis, subtus paullo pallidior, tantum ad nervos costamque sparse adpresso-pilosa, in axillis nervorum sparse barbata, nervis lateralibus utroque latere 3 vel 4; racemi solitarii vel 2–3-fasciculati usque ad 3.5 cm. longi laxe multiflori, pedicellis fere 3 mm. longis glabris, rhachi sparse minute pilosula, bracteis minutis vaginantibus; capsula 3.5 mm. longa subglobosa glabra apice apiculata.—In forest, La Palma de San Ramón, 1,150 meters, August, 1925, *Brenes 4365* (type in Herb. Field Mus.). Yerba Buena, northeast of San Isidro de Heredia, 2,000 meters, moist forest, *Standley & Valerio 49894, 49852.* La Palma de San Ramón, *Brenes 20634, 5499, 6821.* The other Central American species, *L. pedicellata* (Standl.) L. B. Smith, which grows on the Atlantic coast of Panama, differs in its broader, almost entire leaves and more elongate racemes.

LUNANIA Hook.

In Central America there are two other species, in Honduras and British Honduras.

Lunania Pittieri Standl., sp. nov.—Praeter inflorescentiam omnino glabra; folia breviter petiolata subcoriacea, petiolo 10–15 mm. longo; lamina lanceolato-oblonga 11–17 cm. longa 3.5–6 cm. lata longe anguste caudato-attenuata, acumine obtuso, basi obliqua rotundata, integra vel obsolete serrulata, supra lucida, costa nervisque subimpressis, venulis obsoletis, subtus paullo pallidior basi 5-nervia, nervis elevatis, venulis vix prominulis laxe reticulatis; flores racemosi, racemis ca. 7 in paniculam umbelliformem dispositis dense multifloris 30–50 cm. longis, rhachi minute puberula incrassata, pedicellis crassis 2–3 mm. longis; capsula 7–8 mm. longa.—Finca de Zent, Atlantic coast, *Pittier* without number (type in U. S. Nat. Herb.). A shrub or tree, the leaves short-petiolate, glabrous, lance-oblong, narrow-acuminate, entire or nearly

so, 5-nerved at the base; racemes very long, umbellate, the flowers whitish; fruit a small capsule. A species conspicuously distinct from the others known from Central America, because of its greatly elongate racemes with very thick rachis.

PROCKIA P. Br.

Trees or shrubs; leaves membranaceous, 5–7-nerved, dentate, the teeth sometimes terminated by glands; stipules conspicuous, broad, green, persistent; flowers few, in short, terminal racemes; sepals 3; petals 3 or 4, small, white; fruit 3–5-celled, fleshy, indehiscent.—The genus is easy of recognition because of its large stipules.

Prockia costaricensis Standl., sp. nov.—Frutex 3–4.5 m. altus, ramulis gracilibus pilosis; stipulae semireniformes 5–9 mm. longae grosse dentatae; folia 4–7 mm. longe petiolata, lamina membranacea elliptico-oblonga vel lanceolato-oblonga 9–14 cm. longa 4–6.5 cm. lata longiacuminata basi anguste rotundata vel obtusa 5-plinervia arcte serrata, dentibus apice glanduliferis, supra glabrata subtus praesertim ad nervos minute pilosula; racemi terminales pauciflori, pedicellis ca. 1 cm. longis gracilibus minute pilosulis; sepala persistentia ovata 6–7 mm. longa extus intusque dense minute tomentulosa; fructus ovoideo-globosus 7 mm. longus obtusus glaber stylo elongato terminatus.—La Tejona, north of Tilarán, Guanacaste, 600–700 meters, in moist forest, *Standley & Valerio 45764* (type in U. S. Nat. Herb.); Los Ayotes, near Tilarán, *Standley & Valerio 45544*. Between La Laguna del Arenal and Tilarán, 600–700 meters, *Brenes 12661*. In its appearance the plant is very different from the following species.

Prockia crucis L. Common in forest and thickets of the Pacific slope, ascending to the Meseta Central. Widely distributed in tropical America. Usually a shrub of 2–3 meters, but sometimes a small tree; leaves on petioles of medium length, ovate, acuminate, serrate, densely pubescent or almost glabrous; flowers whitish, the pedicels very long, the sepals 7–8 mm. long; fruits more or less pilose.

TETRATHYLACIUM Poepp. & Endl.

Another Central American species occurs in Panama.

Tetrathylacium costaricense Standl. Journ. Wash. Acad. Sci. 15: 480. 1925. *Sapote.* Llanuras de Currís, Río Diquís, 100

meters, *Pittier 11968*. Forests of the Península de Osa. Endemic. A small or tall tree; leaves short-petiolate, coriaceous, oblong, 18–30 cm. long, 5–8 cm. wide, acuminate, deeply cordate at the base, glabrous, somewhat crenulate; flowers minute, in axillary, sessile spikes; petals none; stamens 4; fruit coriaceous, indehiscent or at last 3–4-valvate.

XYLOSMA Forst.

Shrubs or small trees, almost always armed with simple or branched spines or thorns; leaves coriaceous, short-petiolate, crenate or serrate; flowers small, whitish, dioecious, fasciculate in the leaf axils; stamens numerous; petals none; fruit a 2–8-seeded berry.—Other species occur in Central America. The species are imperfectly known, chiefly because of lack of adequate material for their study. The group is greatly in need of monographic study, because the application of many of the published names is uncertain. It is probable that careful study will reduce substantially the number of species currently recognized.

Xylosma characanthum Standl. Imperfect specimens from the Atlantic coast and from Guanacaste are perhaps referable to this species, which was based originally upon a collection from British Honduras.

Xylosma hispidulum Standl., sp. nov.—Frutex vel arbuscula, trunco spinis magnis ramosis armato, ramulis gracilibus pilis brevibus rigidulis patentibus brunnescentibus hispidulis; folia mediocria 3–4 mm. longe petiolata firme membranacea, lamina lanceolato-oblonga 7–9 cm. longa 2–3 cm. lata anguste acuminata basi obtusa, obtuse adpresse serrata, supra sublucida tantum ad costam nervosque minute pilosula, venis prominulis, subtus ad costam nervosque breviter pilosa, nervis lateralibus utroque latere ca. 5 arcuatis adscendentibus; flores umbellato-fasciculati, pedicellis 5 mm. longis pilosulis; sepala floris feminei 1–1.5 mm. longa subrotundata apice rotundata ciliata dorso glabrata; bacca juvenilis globoso-ovoidea 4 mm. longa glabra.—Changuinola Valley, Panama, March, 1924, *V. C. Dunlap 561* (type in Herb. Field Mus.). A species distinguished by its narrow leaves and the densely pilose branches, covered with short hairs.

Xylosma intermedium (Triana & Planch.) Griseb. Common in forests of the central mountains, 1,000–2,400 meters; region of San Ramón. Panama. A shrub or small tree of 2–6 meters, sometimes unarmed; leaves lance-oblong to elliptic, narrow-acuminate,

lustrous, glabrous, serrate with large teeth; flowers green or yellowish. It is not certain that the specimens referred here really belong to the species named.

Xylosma oligandrum Donn. Smith, Bot. Gaz. 23: 235. 1897. Río Surubres, near San Mateo, 300 meters, *Biolley 2652*. A small, unarmed, glabrous tree; leaves submembranaceous, large, oblong-elliptic, 12–15 cm. long, 5–6.5 cm. wide, acuminate, serrate. I have seen no material of this species.

Xylosma panamense Turcz. *Puipute.* El Coyolar, Prov. Alajuela, in a quebrada. Panama. A spiny shrub of 3–4.5 meters, glabrous; leaves elliptic or almost orbicular, coriaceous, obtuse or rounded at the apex, obtuse at the base, crenate.

Xylosma Seemannii Triana & Planch. *Puipute.* Common in the regions of Cartago and San José, and in the higher parts of the Pacific slope; region of San Ramón. Panama. A shrub of 2–3 meters or more, densely branched, armed with long spines; leaves glabrous, elliptic, acute or acuminate, crenate. An abundant shrub in the neighborhood of Cartago, where it often forms dense and impenetrable thickets and hedges. The plant has been reported from Costa Rica as *X. Salzmanni* Eichl.

Xylosma turrialbanum Donn. Smith, Bot. Gaz. 31: 109. 1901. Aragón, slopes of Turrialba, 630 meters, *Pittier 7518*. A spiny shrub; leaves oblong-elliptic, 9–13 cm. long, acuminate, membranaceous, entire, glabrous. I am not acquainted with this species, which should be very distinct because of its entire leaves.

Xylosma velutinum Triana & Planch. *Puipute, Espino blanco.* Thickets and hedges of the Meseta Central, and in the Pacific tierra caliente. Mexico to Colombia. A shrub or small tree of 2–6 meters, very spiny; leaves elliptic or almost orbicular, very obtuse or rounded at the apex, crenulate, densely soft-pubescent. This species, also, is common in the neighborhood of Cartago and San José, where it is noteworthy for the curious large, branched thorns that cover its trunk.

The genus *Zuelania* probably is represented in Costa Rica by *Z. Guidonia* (Sw.) Britt. & Millsp., but no Costa Rican specimens have been seen.

TURNERACEAE. Turnera Family

Herbs, shrubs, or trees; leaves alternate, petiolate, simple, dentate, often with 2 glands near the base; stipules small or none; flowers axillary, solitary or fasiculate, perfect; calyx 5-lobate, deciduous, the segments imbricate; petals 5, inserted in the throat of the calyx tube; stamens 5, inserted in the calyx tube, the filaments free; styles 3; fruit capsular, 1-celled, 3-valvate, many-seeded.—No other genera occur in Central America.

ERBLICHIA Seem.

The genus contains a single species, which is referred to *Piriqueta* by some authors.

Erblichia odorata Seem. *Piriqueta odorata* Urban. Found only in the vicinity of Tilarán, Guanacaste. Panama to Mexico, but apparently nowhere common. A tree of 6–15 meters; leaves lanceolate or oblong-elliptic, 6–13 cm. long, acute or acuminate, crenate, glabrous above, pilose or almost glabrous beneath; flowers pedicellate, yellow, 8 cm. long, the sepals linear-lanceolate; capsule 4 cm. long, woody, ellipsoid, pilose. A handsome and showy tree because of its large, brightly colored flowers.

PIRIQUETA Aubl.

Piriqueta cistoides (L.) Meyer. Grassy places, region of Cartago, and probably elsewhere. Widely distributed in tropical America. An annual, erect herb, simple or sparsely branched, pilose; leaves almost sessile, linear or linear-lanceolate, somewhat serrulate, stellate-pubescent beneath; flowers small, pedicellate, yellow.

TURNERA L.

Herbs or low shrubs; leaves serrate, often biglandular at the base; flowers mostly small, axillary, yellow, white, or pink, the peduncle often adnate to the petiole; calyx lobes united for half their length, narrow; petals short-clawed, thin, soon withering; fruit a thin-walled capsule, the seeds arillate.—One or more additional species are known from Central America.

Turnera panamensis Urban. Cienaguita near Limón, *Quirós 525*. Panama. A slender shrub 1–4 meters high; leaves lance-oblong, acuminate, coarsely serrate, almost glabrous; flowers bright yellow, about 2.5 cm. long.

Turnera ulmifolia L. Common in thickets and waste places of the Pacific tierra caliente. Widely distributed in tropical America. Plants herbaceous or somewhat woody, usually 30–60 cm. high; leaves petiolate, linear to broadly ovate, obtuse or acute, densely pilose or almost glabrous; flowers pedicellate, 2–3 cm. long, usually yellow but sometimes white, fragrant; capsule 6 mm. long. A highly variable species.

PASSIFLORACEAE. Passion-flower Family

PASSIFLORA L. Passion-flower

Herbaceous or woody vines, provided with tendrils; leaves alternate, entire, dentate, or lobate, often with glands on the blade or petiole; flowers perfect and regular, axillary; calyx 4–5-lobate, persistent; petals 4 or 5, rarely none; filaments monadelphous; throat of the corolla provided with a fringe of filaments, constituting the corona; styles 3; ovary with 3 placentae; fruit baccate, small or sometimes very large, with few or numerous seeds.—Many other species are native in Central America. The flowers are characteristic because of their complicated form, interpreted by many persons formerly as emblematic of the Crucifixion, hence the usual Spanish name of Pasionaria. In preparation of the account of this family the writer is especially indebted to Mr. Ellsworth P. Killip, who has determined much of the material, and has revised the manuscript.

Passiflora adenopoda DC. *Pococa. Ceratosepalum micranthum* Oerst. Amér. Centr. *pl. 17.* 1863. Tuis and Cartago; region of San Ramón. Extending to Mexico. Stipules large, laciniate; leaves membranaceous, 3–5-lobate, deeply cordate at the base, the lobes somewhat serrate, pilose beneath; bracts borne near the middle of the peduncle, lacerate; calyx 3 cm. or more in length.

Passiflora Allardii Hort. *Pasionaria.* A species known only in cultivation, found by the writer in a garden at Santa María de Dota, and said to have come from the nearby mountains. A very handsome vine because of its large flowers, the petals white outside, purple within, the corona violet.

Passiflora ambigua Hemsl. *Granadilla.* Frequent in forest and thickets, at middle elevations. Panama to southern Mexico. A large, woody vine, glabrous; leaves petiolate, oblong, somewhat coriaceous, short-acuminate, obtuse or rounded at the base, entire or remotely serrulate; petiole with 2 glands near the base; flowers

large, white and purple, subtended by 3 large bracts about 5 cm. long; fruit green, globose, 7 cm. broad.

Passiflora apetala Killip, Journ. Wash. Acad. Sci. 12: 255. 1922. *Calzoncillo.* Cerro de Escasú, near San José, *Pittier 13043.* Collected by Oersted between Cartago and Candelaria; Fraijanes, Santa María de Dota, and Cerro de Las Lajas; San Ramón. Endemic. A glabrous, herbaceous vine; leaves deeply bilobate, the lobes acute, entire; flowers small, greenish, the bracts setaceous and caducous; sepals 6 mm. long; petals none; fruit globose, black, 1 cm. broad. In the original publication of this species the locality is given in error as Irazú. The type collection was reported once as *P. dichthyophylla.* To this species, as to many others, the country people attribute diuretic properties.

Passiflora auriculata HBK. Common in forests and thickets of the Atlantic tierra caliente, also at La Palma de San José. Nicaragua to South America. Petiole with auricular glands near the base; leaves broadly ovate, acute, rounded or somewhat cordate at the base, obscurely lobate or entire, almost glabrous above, usually soft-pubescent beneath; flowers small, greenish.

Passiflora biflora Lam. *Calzoncillo, Ñorbito, Sandía cimarrona. P. lunata* Willd. From the coasts to the mountains of the central region, common in many localities; region of San Ramón. Widely distributed in tropical America. A herbaceous vine; leaves shortly bilobate, often much broader than long, the lobes usually rounded at the apex, glabrous or nearly so, with conspicuous glands near the base; petiole without glands; flowers small, greenish white; fruit globose, 1.5 cm. broad, blackish blue. Of this species Pittier writes: "The Térraba Indians formerly prepared an aphrodisiac by throwing into a boiling infusion of the plant ten to twenty worms of the kind that eat maize, a cricket leg, and the crushed stems of *cañagra.*"

Passiflora capsularis L. Thickets and forests of the central region; San Ramón. Mexico to Paraguay. A herbaceous vine, the petioles without glands; leaf blades deeply bilobate, densely pubescent, the lobes narrow, attenuate, entire; flowers small, whitish, not bracted.

Passiflora coriacea Juss. *Ala de murciélago.* Common in forests and thickets of the tierra caliente, ascending to 900 meters. Widely distributed in tropical America. Differing from all other Costa Rican species in having coriaceous, peltate leaves, twice as

broad as long; flowers small, greenish; petals none. In other parts of Central America this species is often called Media-luna.

Passiflora costaricensis Killip, Journ. Wash. Acad. Sci. 12: 257. 1922. Forests of Shirores, Talamanca, *Tonduz 9327*. Collected also at various localities on the Atlantic coast, and in the region of Dota. Ranging to Guatemala. Petioles without glands; leaves 9–13 cm. long, shortly bilobate, the lobes erect, acute, densely soft-pilose on both sides, entire; flowers not bracteate, the sepals pilose, 2 cm. long; fruit ellipsoid, 7–8 cm. long.

Passiflora dioscoreifolia Killip, Journ. Wash. Acad. Sci. 14: 108. 1924. La Palma, *Stork 436*. Region of San Ramón, at 1,100 meters. Endemic. Stipules semi-ovate, 1 cm. long, undulate; petiole with 2 glands near the apex; leaves oblong-ovate, 8–10 cm. long, acuminate, cordate at the base, entire, somewhat pilose above, glabrous beneath; bracts setaceous; sepals 2 cm. long, somewhat pubescent; petals white.

Passiflora edulis Sims. Cultivated in the region of San José, and perhaps elsewhere. Native of Brazil. A large vine; petioles glandular at the apex; leaves deeply 3-lobate, the lobes acute or acuminate, serrate, glabrous; flowers rather large, white and purple; fruit globose-oblong, purple-dotted when ripe, with a hard rind. This species is sometimes planted for its edible fruit.

Passiflora foetida L. *Ñorbo, Bombillo*. Occasional in thickets, Meseta Central to the coasts; Guanacaste; region of San Ramón. Widely distributed in tropical America, represented in Costa Rica by the variety *gossypiifolia* (Desv.) Mart. A herbaceous vine, with a very unpleasant odor, covered with long, slender, soft hairs, some of the hairs terminated by a viscid gland; leaves angulate or lobate, dentate; bracts deeply divided into slender lobes; flowers greenish. Of this species Pittier says: "The Indians attribute to it medicinal virtues, and the white people use it for certain diseases of women. The name Ñorbo, noted in Térraba, seems to belong to the language of the tribe."

Passiflora gracilis Jacq. Hatillo, *Solís 31*. Ranging to southern Brazil. Plants glabrous; stipules small, linear, deciduous; petiole biglandular at the middle; leaves trilobate, the lobes obtuse, entire, glaucescent beneath; flowers about 2 cm. broad, the sepals winged dorsally; petals none; fruit ellipsoid, glabrous, 2 cm. long.

Passiflora Hahnii (Fourn.) Masters. Reported from Llanuras de Santa Clara, *J. D. Smith 6529*. Colombia to Mexico, A herbaceous vine; stipules very large and foliaceous, dentate; petioles without glands; leaf blades peltate, ovate-rounded, membranaceous, somewhat trilobate, entire; bracts cordate, about 2 cm. wide; flowers greenish white, the calyx almost 3 cm. long.

Passiflora isotriloba Cufodontis, Archivio Bot. 9: 196. 1933. Near Guayabillos, Volcán de Irazú, 2,200 meters, *Reimoser 289*. Stipules subulate; petiole without glands; leaf blades up to 4.5 cm. long, rounded or somewhat cordate at the base, truncate and trilobate at the apex, the lobes triangular, hispid; bracts pinnatisect, hispid; flowers greenish white, the sepals 1.5 cm. long. Perhaps not distinct from *P. sexflora*.

Passiflora lancearia Masters, Journ. Bot. 23: 114. 1885. Volcán de Irazú, 1,500–1,600 meters, *Lehmann 1255*. Regions of La Palma and La Hondura de San José, and in the Atlantic coast; region of San Ramón. Endemic. Plants glabrous; petioles without glands; leaves mostly oblong-ovate, slightly narrowed toward each end, obtuse, obscurely lobulate above the middle, or the leaves on sterile branches rather deeply obtuse-lobate, glandular-ocellate beneath toward the base; bracts minute; flowers 3 cm. broad, whitish, the sepals obtuse.

Passiflora ligularis Juss. *Granadilla*. Cultivated commonly, and naturalized in some places, but probably not native. Mexico to Bolivia. A large vine, herbaceous, glabrous; stipules large, ovate; petiole with filiform glands; leaves large, broadly ovate, deeply cordate at the base, entire; bracts large, ovate, somewhat united; flowers large, 5–9 cm. wide. The plant is well known throughout Central America because of its edible fruits, as large as a large hen's egg, and yellow when ripe. The seeds, large but not hard, are surrounded by a mass of mucilaginous pulp of delicate and most agreeable flavor. The fruit is one of the favorite desserts of Central America.

Passiflora membranacea Benth. *Granadilla*. Common in forests of the central mountains, 1,400-2,400 meters. Ranging to Mexico. A large, herbaceous vine, glabrous; stipules large, semireniform, entire; petiole without glands; leaf blades almost orbicular but wider than long, subpeltate, entire or obscurely trilobate, truncate at the base; pedicels very long and slender; bracts large, rounded-

cordate, red or pink. An exceedingly beautiful plant because of its large and delicately colored bracts. It is said that the fruits are similar to those of the common granadilla, and edible.

Passiflora menispermifolia HBK. Talamanca; forests near Tilarán, Guanacaste. Nicaragua to Colombia. A densely pilose, herbaceous vine; stipules large, dentate; petiole with several glands; leaves somewhat trilobate, cordate at the base; bracts narrow, serrulate; sepals about 2.5 cm. long. Reported from Costa Rica under the name *P. pilosa* Ruiz & Pavón.

Passiflora Oerstedii Masters in Mart. Fl. Bras. 13, pt. 1: 562. 1872. Monte Aguacate, *Oersted*. Common in the mountains south of Cartago, also in the Atlantic coast, in Guanacaste, and in the region of San Ramón. Mexico to Venezuela. Petiole with 6 glands; stipules lanceolate; leaves glabrous, membranaceous, oblong, acute, rounded at the base; flowers 7 cm. wide, the sepals 3.5 cm. long. *P. Oerstedii* var. *choconiana* (Wats.) Killip, collected at Piedra Blanca, Villa Colón, *M. Valerio 1318*, is a form in which the leaves are deeply trilobate.

Passiflora ornithoura Masters. Reported from El Copey and San José. *P. dicthyophylla* Masters. Also in Guatemala and Salvador. A glabrous vine, the stipules linear-subulate, caducous; petioles without glands; blades with glands near the base, deeply bilobate, the lobes narrow, entire; bracts minute, filiform; flowers 2 cm. wide, the sepals oblong, obtuse; fruit globose, 1 cm. in diameter.

Passiflora pediculata Masters, Bot. Gaz. 23: 247. 1897. Río Torres, near San Francisco de Guadalupe, 1,020 meters, *Tonduz 7250*. Collected also at El Hatillo near San José, 1,100 meters, *Solís 31;* and at San José, *Brade 2329*. Endemic. Glabrous; stipules caducous, linear-subulate; petiole without glands, or with 2 near the base; blades cordate at the base, trilobate almost to the middle, the lobes oblong; bracts caducous, linear-subulate; flowers 3 cm. wide, the sepals oblong, obtuse.

Passiflora Pittieri Masters, Bot. Gaz. 23: 246. 1897. Santo Domingo de Golfo Dulce, *Pittier 9894*. Endemic. A small tree or a shrub; petiole with glands at the apex; stipules linear-subulate; blades about 10 cm. long and 4 cm. wide, subcoriaceous, oblong, acuminate, glabrous; bracts setiform; sepals 4 cm. long, oblong, obtuse; ovary tomentose.

Passiflora platyloba Killip, Journ. Wash. Acad. Sci. 12: 260. 1922. La Balsa del Río Grande, Prov. Alajuela, *Pittier 2653*. El Coyolar; Guanacaste. Ranging to Guatemala. Stipules linear; petioles with 2 glands toward the base; blades trilobate to the middle, 10–14 cm. long, glabrous, cordate at the base; bracts ovate, entire, 5–6 cm. long, acute, puberulent; flowers purple, the sepals oblong-lanceolate, 2 cm. long.

Passiflora pulchella HBK. *P. pulchella* var. *bifidata* Masters, Bot. Jahrb. 8: 220. 1887 (based in part upon a collection from Puntarenas, *Lehmann 1730*). In thickets, region of Puntarenas. Mexico to northern South America. A glabrous vine, the stipules small and narrow; petiole without glands; leaves coriaceous, obtuse at the base, emarginate to deeply bilobate, glabrous, the lobes rounded at the apex; bracts broad, about 1.5 cm. long; flowers 5 cm. wide.

Passiflora quadrangularis L. *Granadilla, Granadilla real.* Common in forests of the tierra caliente, also cultivated. Probably native of Central America, but cultivated in many tropical regions. A large vine, the stems sharply 4-angled; stipules ovate; leaf blades large, ovate, cordate at the base, entire; petiole with 6 glands; bracts ovate; fruit green, as large as a muskmelon, inflated and light in weight. The plant is cultivated commonly in the tierra caliente of Central America for its fruit. The pulp has an agreeable, acidulous flavor, and is employed for preparing refreshing beverages.

Passiflora Seemanni Griseb. Valley of Río Changuinola. Colombia to southern Mexico. A large, glabrous vine; stipules linear; petiole with 2 glands at the apex; leaves broadly ovate, cordate at the base, rounded at the apex, entire; bracts large, ovate, acute, entire; flowers blue and white, 5–7 cm. wide. It is difficult to list plants in the order of their beauty, but I should certainly cite the flowers of this passion-vine among the half dozen most beautiful ones of Central America. They exhibit a mixture of white and an exquisite shade of blue.

Passiflora serratifolia L. Forests of the coasts, also at La Palma de San José; San Ramón. Ranging to Mexico. A large vine, the stipules linear; petiole with 6 glands; blades oblong, acuminate, rounded at the base, minutely serrulate, pubescent beneath; bracts oblong-lanceolate; flowers large, lilac, the sepals oblong, aristate; fruit about 8 cm. long, edible.

Passiflora sexflora Juss. Occasional at middle elevations in the central region. Mexico and West Indies to Colombia. Stipules linear-subulate; petiole without glands; blades somewhat cordate at the base, trilobate at the apex, the intermediate lobe very short, soft-pilose; bracts linear, sometimes lobate; flowers small, 1.5 cm. wide.

Passiflora Standleyi Killip. Collected only at Aserrí. Also in Salvador. Stipules narrowly linear-falcate; petioles without glands, the blades oblong, bilobate one-half to two-thirds their length, the lobes obtuse or acutish, glabrous, ocellate; bracts setaceous; flowers bluish purple, 3–4 cm. wide.

Passiflora suberosa L. Common in thickets of the Meseta Central; region of San Ramón. Widely distributed in tropical America. A slender vine, somewhat woody, the stipules filiform; petiole with 2 glands; blades variable in shape, usually oblong or lanceolate, and entire or trilobate, glabrous to densely pubescent; bracts setiform; flowers small, greenish; petals none; fruits small, globose.

Passiflora talamancensis Killip, Journ. Wash. Acad. Sci. 12:260. 1922. Forests of Shirores, Talamanca, 100 meters, *Tonduz 9329*. Also near El Cairo. Endemic. Stipules linear-subulate; petioles without glands; blades ovate or oval, 6–12 cm. long, shallowly trilobate or 2–3-dentate at the apex, subcoriaceous, puberulent beneath; bracts setiform; sepals oblong, obtuse, 1.5 cm. long; flowers greenish white. Material of this species has been referred incorrectly to *P. fuscinata* Mast.

Passiflora vitifolia HBK. Common in moist forests of the tierra caliente. Nicaragua to Peru. A large, somewhat woody vine; stipules subulate; petiole with 2 glands at the base; blades trilobate, pubescent, the lobes narrow, serrate, acuminate; flowers arising on the branches or the lower part of the trunk, about 12 cm. wide, of a deep and intense red; bracts large, oblong or ovate, red. This is another handsome plant, noteworthy for the intense, fiery red of its large blossoms.

TETRASTYLIS Barbosa Rodriguez

A genus of two species, the other Brazilian. Differing from *Passiflora* in having 4 styles and 4 placentae.

Tetrastylis lobata Killip, Journ. Wash. Acad. Sci. 16: 368. 1926. La Hondura, Prov. San José, 1,200–1,500 meters, *Standley 51917*.

Common in forests of the tierra caliente, and ascending the mountains of the central region. Endemic. A herbaceous vine, the stipules semi-ovate, entire; petiole with 2 glands near the middle; blades 10–15 cm. long, trilobate, the lobes broad, acuminate, membranaceous, hispidulous above with hooked hairs, glabrous beneath; bracts setiform; flowers 3.5–6 cm. wide, whitish with violet stripes, the sepals oblong-lanceolate, 1.5–2.5 cm. long, pubescent; fruit obovoid, 10 cm. long.

CARICACEAE. Papaya Family

Trees or shrubs, with milky latex; leaves alternate, long-petiolate, digitately compound or simple, without stipules; flowers perfect or usually unisexual and dioecious, the pistillate solitary and axillary or in small panicles; calyx small, flat or campanulate, 5-lobate; corolla of the staminate flower with an elongate tube, the limb 5-lobate; corolla of the pistillate flower of 5 distinct or nearly distinct segments; stamens 10, inserted in 2 series in the throat of the corolla; fruit a large berry with 1–5 cells.—No other genera are known from Central America.

CARICA L. Papaya

Shrubs or trees, the trunk simple or branched; leaves simple or deeply lobate, sometimes digitate; flowers generally dioecious and axillary; fruit large, usually edible.—There probably are no other species in Central America.

Carica dolichaula Donn. Smith, Bot. Gaz. 23: 247. 1897. *Papaya, Papaya de monte, Papayillo, Palo de barril.* Río Zhorquín, Talamanca, *Tonduz 8509.* Common in forests of the Atlantic tierra caliente, and in Guanacaste; San Ramón. Ranging to British Honduras. A branching shrub, or often a tall and corpulent tree, glabrous; leaves digitate, the 3–5 leaflets short-petiolate, ovate-oblong, narrow-acuminate, entire or sometimes lobulate, green beneath; flowers white, the pistillate 5–7 cm. long, very narrow; fruit as large as a lemon. The palo de barril, which I believe referable to this species, is common in Guanacaste, where it is a large tree with broad crown and a very thick trunk. This is so soft or spongy that with a few slashes of a machete it is possible to fell a large tree. If a large trunk is thus cut, and left for some weeks to dry, it is possible to separate a cylinder of bark. Sections of this are used in place of barrels, for storing maize and other articles.

Carica Papaya L. *Papaya.* Cultivated everywhere in the tierra caliente, and in the lower part of the temperate region, up to an elevation of 1,200 meters; sometimes planted even at higher elevations, but it does not produce well there; wild in some regions, but probably not truly native. A species of wide distribution in tropical America, but its exact native region uncertain. The fruit exhibits many variations in shape and size. The fruits of wild plants are small and scarcely edible. It is probably a form of this species that Wercklé describes from the Pacific coast, with the name Suara; it has smaller leaves than *C. Papaya,* and a more slender trunk; the fruits are small and globose. The latex that runs from all parts of the papaya plant, when cut, contains a principle that possesses to a high degree the properties of pepsin. Indian names reported for the plant are: Kitshú (Cabécara); Hu-kitshú (Bribrí); Ku-ú-krá (Brunka); Katón (Guatuso); Shigvó (Térraba); Cuh (Boruca).

Carica peltata Hook. & Arn. *Papaya de mico, Tapaculo, Lerdo.* Reported by Pittier and by Wercklé from the forests of the coasts. Also in Nicaragua. A plant somewhat resembling *C. Papaya,* but the leaves small and peltate (not peltate in *C. Papaya*). The fruit is said to be small but good to eat and very fragrant; seeds large, surrounded by edible pulp; rind like that of an orange. Pittier notes the following Indian names: Kitshú (Bribrí), Shanuó (Térraba).

JACARATIA Endl.

One other Central American species grows in Guatemala and Salvador.

Jacaratia costaricensis I. M. Johnston, Contr. Gray Herb. 70: 79. 1924. *Papayillo de venado.* Forests of Las Vueltas, Tucurrique, 700 meters, *Tonduz 12881.* A pyramidal tree, the young branches armed with prickles; leaves digitate, the 5–7 leaflets oblanceolate, 6–11 cm. long, acuminate, entire, very pale beneath; staminate flowers 17 mm. long. A little known species, but it is probably the tree described by Wercklé from the forests of the Atlantic coast—a large tree, the trunk swollen at the base, as much as a meter in diameter, the bark ashy; fruit small and not edible.

LOASACEAE. Loasa Family

Herbs, usually hispid or rough, often provided with stinging hairs; leaves opposite or alternate, entire or pinnatifid, without stipules; flowers regular, perfect, solitary, racemose, or cymose;

calyx tube united with the ovary; sepals 4 or 5, persistent; petals 4 or 5, inserted in the throat of the calyx; petaliform scales sometimes present between the petals; stamens usually numerous, inserted with the petals; ovary inferior, commonly 1-celled; fruit capsular.—The genus *Gronovia* probably is represented in Costa Rica. It is a scandent herb with deeply cordate leaves, covered with stinging hairs.

KLAPROTHIA HBK.

The genus consists of a single species.

Klaprothia mentzelioides HBK. Wet forests of the slopes of the central volcanoes, 1,500–2,000 meters. Colombia to Bolivia. An erect or ascending herb of 30–90 cm., covered with very short, rough, not stinging hairs; leaves opposite, long-petiolate, ovate, acuminate, serrate; inflorescence terminal, pedunculate, cymose, with few very small flowers; calyx tube subglobose, 2–3 mm. long. The genus has not been reported previously from North America.

LOASA Adans.

Herbs, provided with stinging hairs; leaves alternate or opposite, entire, lobate, or compound; flowers usually large and showy, white or yellow.—No other species are recorded for Central America.

Loasa grandis Standl. Journ. Wash. Acad. Sci. 17: 12. 1927. Wet forests near Tilarán, Guanacaste, 625 meters, *Standley & Valerio 44558*. A coarse herb of 1.5–2.5 meters, covered with stinging hairs; leaves alternate, petiolate, 15–30 cm. long, rounded or cordate at the base, shallowly lobate; sepals 1 cm. long, dentate; petals pale green, almost orbicular, 3 cm. long.

Loasa speciosa Donn. Smith, Bot. Gaz. 23: 8. 1897. *Campana, Ortiga veinticuatro*. Forests of Volcán de Turrialba, 2,800 meters, *Pittier 875*. Known only from the slopes of Turrialba and Irazú, at 2,000–2,800 meters. Endemic. An erect herb of 1–1.5 meters, covered with long, stinging hairs; lower leaves opposite, palmate-lobate; flowers recurved, campanulate, about 6 cm. long, the petals orange-yellow. A beautiful and conspicuous plant on account of its large and brilliantly colored flowers, but well protected by the abundance of savagely stinging hairs, much worse than those of any nettle. The name "veinticuatro" (twenty-four) refers to the duration of the pain that results from stinging by the plant.

Loasa triphylla Juss. var. **rudis** (Benth.) Urban & Gilg. *Ortiga, Pringamoza, Pringamosca. L. bipinnata* Donn. Smith, Bot.

Gaz. 23: 7. 1897 (Desamparados, 1,020 meters, *Pittier 1314*). Common in forests and thickets of the Meseta Central, 1,000–1,800 meters. Mexico and Central America; other forms of the species exist in South America. An erect herb of 1 meter or less, covered with stinging hairs; leaves alternate, petiolate, pinnate or pinnatifid; flowers 1.5 cm. long, the small petals white; capsule 2.5 cm. long. An abundant plant in many places about San José, and very troublesome, because the hairs easily penetrate thin clothing, causing intense pain in the parts that they sting. Although the proper local name of the plant is *pringamoza*, the country people almost always call it *pringamosca*, which has a quite different meaning.

SCLEROTHRIX Presl

The genus contains a single species.

Sclerothrix fasciculata Presl. Grassy places, vicinity of San José, and Cerro de Aguacate. Mexico to Bolivia. An annual herb a meter high or less, erect or ascending, very rough and covered with short hairs; leaves opposite, petiolate, ovate to oblong, acuminate, serrate; inflorescence terminal, sessile, composed of short, raceme-like, few-flowered branches; calyx tube 1–2.5 mm. long, oblong; petals white, 1.5 mm. long; capsule narrowly oblong, 4–9 mm. long, when mature spirally twisted.

BEGONIACEAE. Begonia Family

Reference: C. De Candolle in Pittier, Prim. 1: 256. 1896.

Herbs or shrubs, sometimes annuals, often very succulent, the stems erect and simple or branched, or rarely scandent, occasionally reduced to a tuberous rhizome; leaves alternate, stipulate, entire, lobate, or digitately parted, often with very unequal sides, rarely peltate; peduncles axillary, divided into unisexual or bisexual cymes, commonly with conspicuous bracts and bractlets; flowers monoecious, mostly asymmetric; perianth segments of the staminate flower 2 or 4, free, the stamens indefinite, with free or united filaments; perianth segments of the pistillate flower 2–5, imbricate; ovary inferior, commonly 3-celled and 3-winged or 3-angulate; seeds minute, exceedingly numerous.—Numerous other species occur in other parts of Central America. Of a number of the species described from Costa Rica the writer has seen no authentic material. It is suspected that several of the species listed below should be reduced to synonymy, but the material available at present, while fairly ample, is insufficient for a satisfactory and final disposition of some of the species.

Begonia alnifolia A. DC. *Begonia.* Common in forest, Meseta Central to the Atlantic lowlands, 100–1,600 meters; Atlantic slopes of Guanacaste; region of San Ramón. Extending to Colombia. Plants usually erect and often much branched, 2 meters high or less, glabrous throughout or nearly so; leaves short-petiolate, oblong-ovate, acuminate, very unequally cordate at the base, finely denticulate, penninerved, with about 12 nerves on each side; flowers white or pink, in small or large cymes; staminate sepals 4 mm. wide; capsule 6–7 mm. long, one of the angles protracted into a broad, rounded wing almost 1 cm. wide, the other 2 angles narrowly winged. A rather showy and characteristic plant in forests of the temperate region and less frequent at lower elevations.

Begonia barbana C. DC. Bull. Soc. Bot. Belg. 35, pt. 1: 261. 1896. Stream bank, near La Esmeralda, Volcán de Barba, *Tonduz 1333.* Slopes of the central mountains, also in the region of Dota, mostly at 1,500–2,000 meters. Endemic. Rhizome thick, prostrate and rooting; leaves long-petiolate, the petioles pilose; blades obliquely and broadly ovate, as much as 17 cm. long and 7 cm. wide or even larger, acuminate, obliquely cordate at the base, entire or somewhat serrulate toward the apex, palmately 7-nerved, glabrous above, long-pilose beneath on the nerves; scapes somewhat longer than the leaves, the cymes rather broad and many-flowered, the branches glabrous; pistillate flowers with 2 sepals; staminate sepals as much as 6 mm. long; capsule 1.5 cm. long, acute at the base, the wings truncate at the apex, 2 of them subequal and broader than the other one.

Begonia Biolleyi C. DC. Bull. Soc. Bot. Belg. 35, pt. 1: 263. 1896. Cuesta de La Vieja, 750 meters, *Biolley 960.* Tierra caliente of both coasts, at 850 meters or less. Endemic. Rhizomes thick and prostrate, rooting, densely covered with long-pilose stipules; leaves long-petiolate, the petioles densely covered with long, brown hairs; blades obliquely ovate, thin when dried, about 8 cm. long and 11 cm. wide or larger, acuminate, rounded-cordate at the base, coarsely dentate or somewhat lobate, densely long-pilose, especially beneath; scapes much longer than the leaves, the cymes broad, many-flowered, long-pilose; sepals 2 in both staminate and pistillate flowers, the staminate sepals 6 mm. long; capsule glabrous, 2 cm. long, acute at the base, the wings unequal, obtuse, the largest one subascending.

Begonia Carletonii Standl. Type from the region of Bocas del Toro, Panama. Collected also in the Changuinola Valley, on the Costa Rican border, *V. C. Dunlap 206.* Plants with short, densely

leafy rootstocks, emitting long, slender, rooting stolons, the stems sparsely setose-pilose; leaves long-petiolate, the petioles slender-pilose; blades obliquely ovate, 6–10 cm. long, 3–5 cm. wide, long-acuminate, obliquely and shallowly cordate at the base, finely sinuate-serrate, palmately 8-nerved, sparsely setose-pilose on both surfaces; peduncles equaling the leaves, mostly 2–3-flowered; ovary densely villous; staminate sepals 6 mm. long, sparsely pilose; capsule 7 mm. long, sparsely pilose, the largest wing 6 mm. broad, obtuse, the others much narrower.

Begonia carpinifolia Liebm. Vid. Medd. Kjoebenhavn 1852: 20. 1853. Cerros de Candelaria, 1,800 meters, *Oersted*. Frequent in forests of the central region, chiefly at 1,200–2,400 meters; regions of Dota and San Ramón; reported from Boruca. Endemic. Plants slender, glabrous, often somewhat shrubby and as much as 2 meters high, branched; leaves short-petiolate, penninerved, ovate-oblong or lance-oblong, long-acuminate, unequally obtuse or acutish at the base, obscurely denticulate or almost entire, the lateral nerves about 6 on each side, mostly 5–10 cm. long and 1.5–3 cm. wide; cymes mostly few-flowered and about equaling the leaves, the flowers white or pink; sepals 6 mm. long; capsule glabrous, 5–6 mm. long, one of the angles produced into a wing 12 mm. long, the other angles very narrowly winged. A characteristic and rather handsome plant of mountain forests of the central region.

Begonia conchaefolia A. Dietr. Allgem. Gartenz. 19: 258. 1851. *Begonia, Acedera. B. scutellata* Liebm. Vid. Medd. Kjoebenhavn 1852: 9. 1853 (Cerros de Candelaria, 1,800 meters, *Oersted*). *Gireoudia conchaefolia* Klotzsch, Monatsber. Akad. Berlin 125. 1854. The type was collected in Central America, probably in Costa Rica, by Warscewicz. Frequent in forest of the central region, chiefly at 1,200–1,800 meters, sometimes grown in gardens; reported from Tuis; region of San Ramón; mountains of Guanacaste. Endemic. Plants with a short, thick, prostrate or oblique rhizome; leaves long-petiolate, the petioles villous-tomentose; blades obliquely and broadly ovate, acute, broadly rounded at the base, peltate far above the base, entire or nearly so, glabrate above and with a dark red spot over the attachment to the petiole, brownish-tomentose beneath, very thick and succulent; peduncles longer than the leaves, the cymes rather small, with numerous pink flowers; sepals 2 in both kinds of flowers, 4–6 mm. long; capsules 6–8 mm. long, the narrow wings subequal. A handsome plant, well worthy of cultivation, especially because of the neat foliage.

Begonia Cooperi C. DC. in Donn. Smith, Bot. Gaz. 20: 539. 1895. Cartago, 1,275 meters, *Cooper 5778.* Frequent in the mountains south of Cartago; Pejivalle; region of San Ramón; 900–1,500 meters. Endemic. Similar to *B. alnifolia,* but the branches densely brown-villous, the leaves also more or less densely villous beneath; plants weak and clambering, much branched, 1–2 meters long; leaves usually reddish beneath.

Begonia copeyana C. DC. Bull. Herb. Boiss. II. 8: 316. 1908. Forests of El Copey, 1,800 meters, *Pittier 11788.* Endemic and known only from the region of the type. Leaves long-petiolate, the blades obliquely ovate, about 9 cm. long and 8 cm. wide, protracted-acuminate, equal and rounded-cordate at the base, remotely denticulate, glabrous above, beneath sparsely pilose on the nerves or at the base densely long-pilose, palmately 5-nerved; scapes as long as the petioles, glabrous, few-flowered; sepals 2 in both kinds of flowers, 7 mm. long, glabrous; capsule pilose, the largest wing transverse-oblong, 6 mm. long, obtuse, the 2 other wings almost obsolete.

Begonia corredorana C. DC. Candollea 2: 227. 1925. Llanos de Corredor, *Pittier 10954.* Known only from the type. An erect herb, the branches villous; leaves long-petiolate, the blades ovate, short-acuminate, unequal and cordate at the base, densely villous on both surfaces, serrulate, the teeth setuliferous; inflorescence long-pedunculate, broad, the peduncle sparsely villous, the pistillate flowers bilobate; capsule 5 mm. long, glabrous, the largest wing 15 mm. long and 7 mm. wide; pedicels in fruit almost 1 cm. long.

Begonia cucullata Willd. Reported by C. De Candolle (Bull. Herb. Boiss. II. 8: 317. 1908) from Alto de Ochomogo, *Pittier "11, 10399."* I have seen no Central American material of this South American species. Stems stout, erect, leafy, glabrous; stipules large, foliaceous; leaves petiolate, the blades obliquely ovate, about 7 cm. long, palmately 6–7-nerved, obtuse, inflexed at the base, crenulate; peduncles few-flowered, glabrous; pistillate flowers 5-lobate, white or pinkish; capsule 2.5–3 cm. long, the largest wing ovate-acute, curved upward, the other wings almost obsolete.

Begonia estrellensis C. DC. in Donn. Smith, Bot. Gaz. 20: 540. 1895. Estrella, Prov. Cartago, 1,320 meters, *Cooper 5779.* Frequent in forests of the mountains south of Cartago; Pejivalle; slopes of Volcán de Barba. Endemic. Plants glabrous, 1–2 meters high, somewhat woody; leaves short-petiolate, ovate-elliptic, about 6.5 cm. long and 2.5 cm. wide, acutely acuminate, subequal and obtuse

at the base, serrate toward the apex, penninerved, the lateral nerves 3–4 on each side; inflorescences slightly longer than the leaves, many-flowered, the flowers pinkish white; staminate flowers with 2 sepals 5 mm. long and 2 much smaller petals; pistillate flowers 2–3-lobate; capsule 4 mm. long, the largest wing scarcely 3 mm. wide, subacute, the 2 others much narrower.

Begonia filipes Benth. Villa Colón, at 840 meters; region of San Ramón, 500–600 meters; reported from Cerros de Aguacate. Nicaragua to Panama. Plants slender, erect, annual, the stems glabrous; leaves short-petiolate, palmately nerved, the blades ovate-oblong, 2.5–7 cm. long, long-acuminate, very oblique at the base and produced on one side into a rounded lobe, shallowly lobate and irregularly serrate, sparsely long-villous on the upper surface, glabrous beneath or nearly so; flowers few, small, white, the pistillate 5-lobate; capsules glabrous, 4–6 mm. long, one of the wings 5–6 mm. long and rounded at the apex, directed upward, the other 2 greatly reduced.

Begonia glabra Aubl. *B. scandens* Swartz. *B. physalifolia* Liebm. Vid. Medd. Kjoebenhavn 1852: 19. 1853 (Naranjo, *Oersted*): Frequent in forests of the Atlantic tierra caliente; Cañas Gordas; La Hondura de San José; region of San Ramón; ascending to 1,500 meters. Widely distributed in tropical America. Plants scandent, the stems adherent by roots to tree trunks, glabrous; leaves rather short-petiolate, the blades broadly ovate or ovate-elliptic, mostly 7–10 cm. long, rather abruptly acute or acuminate, rounded or subcordate and almost symmetric at the base, irregularly crenate-dentate, glabrous or nearly so, succulent; stipules large and conspicuous; cymes large, much branched, many-flowered, the flowers white or greenish white, 5–6 mm. long; pistillate flowers 5-lobate; capsules 8–10 mm. long, the wings very unequal, the largest elongate, acute, directed upward. Easy of recognition because of its scandent habit and lack of pubescence.

Begonia glandulosa A. DC. Reported as collected in Costa Rica by Hoffmann. Also in Panama. Plants erect, simple or branched, the branches and petioles fuscous-pilose; leaves on rather long petioles, the blades transversely and broadly oblique-ovate, 10–15 cm. long, palmately 9-nerved, very shortly caudate-acuminate, shallowly cordate at the base, undulate-crenulate, glabrous above, puberulent beneath at the base of the nerves; peduncles as long as the leaves, glabrate, the cymes broad, several times dichotomous;

pistillate flowers 4-lobate; capsules 4 mm. long or larger, the larger wing much elongate, obtuse or acutish, directed upward, dotted with pellucid glands.—Illustrated, Bot. Mag. *pl. 5256*.

Begonia heracleifolia Cham. & Schlecht. Cultivated commonly in gardens, but probably not native in Costa Rica. Native in Mexico and apparently also in various parts of Central America as far south as Honduras. Plants with a thick, setose rhizome; leaves large, long-petiolate, the thick petioles hirsute and covered with fimbriate scales; blades deeply 7-lobate, the lobes narrow, lobate and dentate, glabrate above, pilose beneath; flowers pink, showy. This species is grown commonly as a house plant in the United States and doubtless in many other temperate regions. In Costa Rica there are seen in gardens a number of other exotic species of *Begonia*, chiefly, it is probable, of Brazilian origin.

Begonia hygrophilia C. DC. Bull. Soc. Bot. Belg. 35, pt. 1: 265. 1896. Surubres, near San Mateo, in moist places, 100 meters, *Biolley 7047*. Moist places of the Pacific tierra caliente; regions of Tilarán and Nicoya. Endemic. Plants erect, glabrous, annual, about 30 cm. high or less; leaves small, short-petiolate, oblong-ovate, acuminate, very oblique at the base and broadly rounded on one side, duplicate-serrate; inflorescences small and few-flowered, the flowers greenish white; pistillate flowers 4-lobate; petals none in the staminate flower; capsule 5 mm. long, the largest wing 8 mm. long, the others much reduced. Var. *puberula* C. DC. (op. cit. 266; Térraba, *Tonduz 3910*) is a form in which the leaves are sparsely pilosulous on the upper surface. It is questionable whether this species is distinct from *B. filipes*.

Begonia ignea Warscewicz. Occasional in mountains of the central region, at middle elevations. Also in Guatemala. Plants tall, erect, branched, the stems and petioles glandular-pilose; leaves large, petiolate, the blades broadly and obliquely ovate, palmately 4–5-nerved and lobate, serrate, shallowly cordate at the base, more or less hispid-villous on both surfaces, the lobes acute; cymes few-flowered or broad and many-flowered, the pedicels pilose, the flowers pink, about 1.5 cm. long; sepals pilosulous; capsules pilose, 2 cm. long, the largest wing about 1 cm. wide, the 2 others slightly narrower. Var. *tuberosa* C. DC. (Bull. Soc. Bot. Belg. 35, pt. 1: 267. 1896; San Juan, *Tonduz 1299 bis*), characterized by having a large tuber, is probably no different from the typical form.

Begonia involucrata Liebm. Vid. Medd. Kjoebenhavn 1852: 15. 1853. *Gireoudia involucrata* Klotzsch, Monatsber. Akad. Berlin 125. 1854. *G. laciniata* Klotzsch, loc. cit. *B. laciniosa* A. DC. in DC. Prodr. 15, pt. 1: 340. 1864 (Central America, *Warscewicz*). Cerros de Candelaria, *Oersted*. Common in forests of the central region, at middle or somewhat higher elevations; regions of Dota and San Ramón. Probably endemic. Plants erect, often somewhat branched and as much as 1.5 meters high, the stems, petioles, and peduncles with a rufous tomentum of long hairs; leaves large, long-petiolate, the blades broadly and obliquely ovate, 9–12-nerved, acute or acuminate, rather shallowly cordate at the base, lobate-dentate or often with 2–3 rather deep lobes, rarely almost entire, more or less pilose but sometimes glabrate on the upper surface; peduncles usually longer than the leaves, the cymes at first often greatly condensed and covered by the large, brown bracts, later often broad and spreading, the pedicels usually glabrous, the flowers white; sepals 2; capsules 7–10 mm. long, the larger wing elongate, obtuse or acutish, directed upward, the others much reduced.

Begonia lignescens Morton, Journ. Wash. Acad. Sci. 27: 308. 1937. Vicinity of El General, Prov. San José, 1,160 meters, *Skutch 2853*. Stems scandent, glabrous; leaves alternate, almost sessile, the blades narrowly oblong, 7–9 cm. long, 2–2.5 cm. wide, oblique, short-acuminate, obliquely cuneate at the base, denticulate toward the apex, glabrous, penninerved, the nerves 4–5 pairs; inflorescence large and many-flowered, cymose, the bracts caducous, elongate-lanceolate, acute, glabrous; staminate sepals 2, white, lanceolate, 15 mm. long, the petals 2.5 mm. long; pistillate sepals 2, elongate-lanceolate, almost 2 cm. long; ovary glabrous, one of the 3 wings cultriform, 1 cm. long (immature), the others very narrow.

Begonia Luxii C. DC. *B. Luxii* var. *pilosior* C. DC. Bull. Soc. Bot. Belg. 35, pt. 1: 266. 1896. Forests of Barba, *Tonduz 1332*. Reported from numerous localities in the Meseta Central and on the slopes of Barba and Poás; region of Dota; at 1,800 meters or less. The typical form of the species is from Guatemala. Plants erect and more or less branched; leaves petiolate, the blades transverse-ovate, acuminate, unequally cordate at the base, 11 cm. long and 5 cm. wide or smaller, serrulate, palmately 6-nerved, more or less pilosulous on both surfaces; inflorescences few-flowered, shorter than the leaves or little exceeding them; sepals of the staminate flower 2; pistillate flowers 3-lobate; capsule glabrous, with 2 or 3 wings, one of the wings slightly broader than the others.

Begonia multinervia Liebm. Vid. Medd. Kjoebenhavn 1852: 18. 1853. *B. cuspidata* C. DC. Bull. Soc. Bot. Belg. 35, pt. 1: 260. 1896 (Río Platanar near Buenos Aires, *Tonduz 6524*). Jarís, 900 meters, *Oersted*. Common in forests of the tierra caliente, usually at 900 meters or less; region of San Ramón, ascending to 1,100 meters; La Hondura de San José. Perhaps endemic, although certain species described from other parts of Central America may be synonymous. Plants erect, more or less branched, glabrous; leaves long-petiolate, the blades broadly and obliquely transverse-ovate, mostly 15–20 cm. long, shortly cuspidate-acuminate, shallowly cordate at the base, palmately 8–11-nerved; inflorescences equaling or longer than the leaves, usually broad and many-flowered, the flowers pink, 6 mm. long; sepals 2; capsules about 7 mm. long, the largest wing as much as 13 mm. long, broad, rounded at the apex, the 2 others greatly reduced. The leaves are sometimes red on the lower surface. The plant is a handsome and rather showy one.

Begonia Pittieri C. DC. Bull. Herb. Boiss. II. 8: 316. 1908. La Palma, Prov. San José, 1,460 meters, *Pittier 7417*. Frequent in the regions of La Palma and San Ramón, at 1,000–1,600 meters. Endemic. Belonging to subgenus *Casparya;* plants small, erect, about 30 cm. high, mostly simple; leaves petiolate, the blades ovate-oblong, mostly 6–9 cm. long, long-acuminate, very oblique and shallowly cordate at the base, palmately 5-nerved, denticulate, sparsely long-pilose on the upper surface, glabrous beneath; cymes much shorter than the leaves, small, few-flowered; sepals of the staminate flower 2 and 7 mm. long, the petals much smaller; pistillate flower 3-parted; capsule 6 mm. long, bearing on each angle a spreading, horn-like appendage 1 cm. long. The plants are sometimes epiphytic in habit.

Begonia plebeja Liebm. Vid. Medd. Kjoebenhavn 1852: 8. 1853. Based in part upon material from Cerros de Aguacate, *Oersted*. Also in Nicaragua. Region of San Ramón; Tacares, 800 meters; reported also from La Verbena and Nicoya. Plants with a short, thick, oblique rhizome; leaves long-petiolate, thin when dried, the blades obliquely and broadly ovate, acute or short-acuminate, cordate at the base, irregularly dentate and denticulate, ciliate, sometimes shallowly lobate, glabrous above, beneath sparsely pilose; scapes equaling or longer than the leaves, at first rufous-pilose, later glabrate, the cymes rather small and few-flowered, the flowers white; sepals 2; capsule glabrous, the largest wing triangular, truncate above, the other 2 much narrower.

Begonia pruinata A. DC. in DC. Prodr. 15, pt. 1: 338. 1864. *Gireoudia pruinata* Klotzsch, Monatsber. Akad. Berlin 125. 1854. Based upon plants collected in Costa Rica by Warscewicz. Apparently not found by recent collectors, and I have seen no representation of the species. Leaves peltate, the blades 7–8-nerved, obliquely ovate, acute, angulate-sinuate, minutely and irregularly dentate, glabrous above, pilosulous beneath; sepals 2, white, 8–12 mm. long; capsule 1 cm. long, acute at the base, the wings subequal, obtuse.

Begonia ripicola C. DC. Bull. Herb. Boiss. II. 8: 314. 1908. Thickets on banks of Río Torres, near San Francisco de Guadalupe, *Pittier 9825*. Known only from the original collection. Plants rhizomatous; leaves long-petiolate, the petioles sparsely pilose; blades obliquely rounded-ovate, about 11 cm. long and 13 cm. wide, short-acuminate, cordate at the base, sparsely denticulate and ciliate, glabrous above, sparsely pilose beneath, palmately 8-nerved; pedicels pilose, sometimes 2 cm. long; sepals 2 and 6 mm. long, glabrous; capsule sparsely long-pilose, the largest wing almost 1 cm. long.

Begonia rosea A. DC. in DC. Prodr. 15, pt. 1: 299. 1864. *Hoffmannella rosea* Klotzsch ex A. DC. loc. cit. in syn. Costa Rica, without definite locality, *Hoffmann 730*. Known only from the original material. Plants slender, erect, annual, simple or sparsely branched, the stem glabrous; leaves petiolate, the blades oblong-ovate, acute, penninerved, 2–2.5 cm. long, obliquely rounded at the base, duplicate-serrate, sparsely pilose above, glabrous beneath; peduncles 2–3-flowered, about equaling the leaves, the flowers white, the staminate sepals 1.5 mm. long; pistillate flowers 5-lobate; capsule 4 mm. long, narrowly and subequally 3-winged. Judging from a photograph of the type (in herb. Berlin), this is closely related to *B. semiovata*.

Begonia semiovata Liebm. *B. flexuosa* A. DC.; *B. guyanensis* var. *glaberrima* C. DC. in Donn. Smith, Bot. Gaz. 20: 540. 1895 (Jiménez, Llanuras de Santa Clara, 195 meters, *J. D. Smith 4814*). Frequent in forest or thickets of the Atlantic tierra caliente; region of San Ramón. Panama to Honduras, and probably much more widely distributed. Plants annual, slender, erect, simple or sparsely branched, the stems glabrous; leaves short-petiolate, very thin when dried, the blades penninerved, ovate-oblong, small, acuminate, obliquely rounded at the base, unequally denticulate-serrate, minutely and sparsely pilose on both surfaces or almost wholly glabrous; peduncles axillary, equaling or shorter than the leaves,

few-flowered, the flowers greenish white, small; pistillate flowers 4–5-lobate; capsules about 6 mm. long, subcordate at each end, the wings narrow, equal. A frequent and rather weedy plant of the Atlantic tierra caliente. It has been reported from Costa Rica as *B. guyanensis* A. DC., a species probably synonymous with *B. semiovata*.

Begonia squamosa C. DC. Bull. Herb. Boiss. II. 8: 315. 1908. Cañas Gordas, 1,100 meters, *Pittier 11181*. Forests of the region of San Ramón, at approximately the same elevation. Endemic. Plants stout, with a thick, horizontal or oblique rhizome; leaves long-petiolate, the petioles densely covered with lanceolate, fimbriate scales; blades large, rounded-ovate, acuminate, deeply cordate at the very oblique base, glabrous, or at least when young squamose along the nerves on the lower surface, palmately 7-nerved, ciliate, the margin sometimes almost entire but more often denticulate and often shallowly lobate; peduncles mostly longer than the leaves, the cymes large and broad, many-flowered; sepals 2, glabrous, about 8 mm. long; capsule glabrous, 6 mm. long, the largest wing 7 mm. long, obtuse, the other 2 much narrower.

Begonia strigillosa Dietr. was collected in Central America, perhaps in Costa Rica, by Warscewicz. However, so far as I know, no similar plant has been found in recent years in Costa Rica, and it may be that the type came from some other country.

Begonia stenoptera C. DC. Smithson. Misc. Coll. 69, No. 12: 2. 1919. Santa Elena de Turrialba, *Pittier*. Also on the slopes of Irazú. Endemic. Branches densely pilose; leaves long-petiolate, the petioles densely pilose; blades ovate, 10 cm. long, acuminate, very unequal at the base and rounded on each side, pilose on both surfaces; peduncles shorter than the petioles, the cymes few-flowered, the pedicels pilose; flowers greenish white or pinkish, 5 mm. long; sepals 2 in the staminate flower, glabrous; pistillate flowers 3-lobate; capsule 10 mm. long, the wings subequal, very narrow, pilose on the margins.

Begonia tenuipila C. DC. Bull. Herb. Boiss. II. 8: 315. 1908. Stream bank near Nicoya, *Tonduz 13515*. Also in the regions of Tilarán, Guanacaste, and Pejivalle. Endemic. Plants rhizomatous; leaves peltate(?), long-petiolate, the petiole glabrous; blades rounded, 15 cm. long, acutely acuminate, dentate and sparsely setaceous on the margins, glabrous on both surfaces, palmately nerved; branches of the inflorescence and pedicels long-pilose, the flowers pink, the 2 sepals of the staminate flower 5.5 mm. long, glabrous; pistillate

flowers bilobate; capsule 6 mm. long, sparsely pilose, the largest wing horizontal, obtuse, the others much narrower.

Begonia Tonduzii C. DC. Bull. Soc. Bot. Belg. 35, pt. 1: 264. 1896. Descentes de La Ardilla, *Tonduz 7599*. Known only from the original collection. Plants branched, the branches glabrous; leaves very shortly petiolate, the petiole only 3 mm. long; blades subfalcate-lanceolate, 9 cm. long, 3.5 cm. wide, acutely acuminate, subacute at the slightly unequal base, remotely denticulate, penninerved, glabrous; inflorescence short, 4–5 times dichotomous, the branches puberulent, the flowers glabrous, reddish, 3 mm. long; staminate sepals 2; pistillate flowers 4-lobate; capsules glabrous, 7 mm. long, the 3 wings subequal, rounded.

Begonia Torresii Standl. Journ. Wash. Acad. Sci. 17: 313. 1927. Wet forest at Las Nubes, Prov. San José, 1,900 meters, *Standley 38561*. Slopes of Turrialba and Irazú, at 1,900–2,400 meters; region of San Ramón, at 975–1,100 meters. Endemic. Subgenus *Casparya;* plants erect, 25–40 cm. high, with few branches, the branches short-villous or glabrate; stipules about 1 cm. long; leaves short-petiolate, the blades oblong or ovate-oblong, 3–7 cm. long, obtuse to acuminate, oblique at the base, rounded on one side and very acute on the other, duplicate-serrate, at first short-villous on both sides but soon glabrate; peduncles with 1–few flowers, the flowers pink; staminate sepals 6 mm. long, glabrous; capsule glabrous, 2 cm. long, rounded at the base, abruptly contracted above into a stout beak 1 cm. long, the body deeply 3-lobate, the triangular lobes divaricate, abruptly contracted into a short horn. The species was named for Prof. Rubén Torres Rojas. This is apparently the plant reported from Costa Rica as *B. Urticae* L. f. var. *hispida* A. DC. (in DC. Prodr. 15, pt. 1: 274. 1864; *Sessea Hoffmanniana* Klotzsch ex A. DC. op. cit. 275), based in part upon a specimen from Aguacate, collected by Hoffmann.

Begonia tovarensis Klotzsch. Occasional in the mountains of the central region, growing in marshy places, often exposed to the sun, ascending to La Palma de San José (1,600 meters); region of Dota; Cartago. Southern Mexico to Venezuela. Plants erect, succulent, sometimes a meter high, the stems red, glabrous; leaves petiolate, ovate-rounded, rather small, rounded at the apex or very obtuse, subcordate and slightly unequal at the base or sometimes deeply cordate, undulate or crenate, sparsely pilose, more or less tomentose beneath on the nerves, palmately nerved; peduncles short and few-flowered, the flowers bright pink, 4–6 mm. long;

staminate sepals 2; pistillate flowers 5-lobate; capsules 1–2 cm. long, glabrous, one of the wings large and broad, obtuse, the other 2 narrower. A showy and handsome plant, often forming large and conspicuous colonies in open marshes. Var. *ocanensis* A. DC., reported from Ciénaga de Agua Buena, Cañas Gordas, *Pittier 11179*, is a form in which the leaves are much more densely tomentose beneath.

Begonia udisilvestris C. DC. Slopes of Poás, Naranjo, slopes of Irazú, region south of Cartago, and in Dota, ascending to 3,000 meters. Also in Panama. Subgenus *Casparya;* plants glabrous, erect; leaves long-petiolate, the blades oblong-ovate, as much as 11 cm. long, long-acuminate, unequal and cordate at the base, serrulate, palmate-nerved; cymes axillary, shorter than the petioles, the pedicels 1 cm. long or more; staminate sepals 2 and 5 mm. long; pistillate flowers 3-lobate; capsule 1 cm. long or more, attenuate into a slender beak, the rather obtuse angles very narrowly winged.

Begonia Valerii Standl. Journ. Wash. Acad. Sci. 17: 313. 1927. El Arenal, Guanacaste, 500 meters, *Standley & Valerio 45245*. Atlantic slope of Guanacaste and at Pejivalle, ascending to 900 meters. Endemic. Plants erect, 1–1.5 meters high, the stems pilose; stipules 1.5–2 cm. long; leaves long-petiolate, the petioles brown-pilose; blades broadly oblique-ovate, 16–26 cm. long, cuspidate-acuminate, deeply cordate at the base, closely denticulate, thinly pilose above or glabrate, thinly pilose beneath, palmately about 10-nerved; peduncles thinly pilose, longer than the leaves, the cymes large and lax, the pedicels pilose, the flowers white or pinkish, 7 mm. long; staminate sepals 2, glabrous; capsule 6 mm. long, sparsely pilose or glabrate, the largest wing oval-oblong, horizontal, rounded at the apex, about 1 cm. in width, the 2 other wings very much narrower.

Begonia vestita C. DC. Bull. Herb. Boiss. II. 8: 315. 1908. Moist forest, Las Vueltas de Tucurrique, 900–1,000 meters, *Pittier 1302*. Also at Fraijanes, on the slopes of Poás. Endemic. Plants rhizomatous, the leaves long-petiolate, the petioles densely covered with lanceolate scales; blades transversely rounded-reniform, large, acute or short-acuminate, deeply cordate at the base, entire, glabrous above, pilose beneath on the nerves; peduncles mostly shorter than the leaves, squamose, the flowers few; sepals 2, the staminate 5 mm. long, glabrous; capsules long-pilose, the largest wing rounded-ovate, descending-transverse, 4 mm. long, the other 2 much narrower.

CACTACEAE. Cactus Family

References: Britton & Rose, The Cactaceae, Carnegie Inst. Wash. Publ. 248, 4 vols. 1919–1923; Alb. Weber, Les Cactées de Costa Rica, Bull. Mus. Hist. Nat. Paris 8: 454–469. 1902.

Succulent plants, terrestrial or epiphytic, often armed with spines; leaves none, except in *Pereskia*, or represented by scales in *Opuntia* and *Nopalea*; flowers regular or irregular, perfect, produced from areoles which also bear the spines when these are present; perianth tube none or often greatly elongate, the perianth segments few or very numerous, not sharply differentiated into sepals and petals; stamens numerous, inserted in the throat of the perianth; fruit a small or large berry.—The cacti are rather poorly represented in Costa Rica, as is usual in the more humid tropics of America. They are represented here chiefly by epiphytic plants, and there is only one representative of the giant *Cereus* species that figure prominently in the landscapes of Mexico. Likewise, the genus *Opuntia*, so important in the rural economy of Mexico, is represented in Costa Rica probably by only a single native species.

In the following treatment the genera are treated conservatively, the innumerable segregates proposed by Britton and Rose being returned to the genera under which they were placed by earlier writers. At the present time, because of the great popularity of cacti among horticulturists, the tendency is to recognize all the Britton and Rose genera and even a number of additional ones. However, it is believed by the writer that most of those groups, based for the greater part upon characters that would not be seriously considered in other families of flowering plants, have no serious claims to recognition as genera but should be treated at best as subgenera. A critical treatment of the family, especially as regards genera, with attention to systematic relationships rather than horticultural sentiment, is seriously needed. The muddling that has characterized treatment of the cacti by horticulturists rather than systematists may be observed readily by anyone who will note the long lists of synonyms cited in *The Cactaceae*, whose authors certainly were not liable to a charge of undue conservatism in this respect.

CEREUS L.

Cereus Aragonii Weber, Bull. Mus. Hist. Nat. Paris 8: 456. 1902. *Cardón. Lemaireocereus Aragonii* Britt. & Rose, Cact. 2: 92. *f. 135.* 1920. Described from Pacific Costa Rica. Planted occasionally in hedges in the Meseta Central, and in various places on the

Pacific slope. Native, according to Alfaro, on rocks along the coast in the provinces of Puntarenas and Guanacaste. Endemic. Stems columnar, as much as 6 meters high, simple or branched, pale green, with 5–8 ribs; areoles brown-felted, the gray spines 8–10, 1–3 cm. long; flowers pink, 6–8 cm. long; ovary bearing clusters of small spines; fruit large, edible, with white flesh and very numerous small, black seeds. The heavy stems are often set closely in the ground to form efficient fences, a custom followed wherever the giant *Cereus* species grow. Alfaro states that the wild and cultivated plants show some variation, especially in size of flowers, and that possibly more than one species is involved.

Cereus Biolleyi Weber ex Schum. Gesamtb. Kakt. Nachtr. 60. 1903. *Rhipsalis Biolleyi* Weber, Bull. Mus. Hist. Nat. Paris 8: 467. 1902. *Weberocereus Biolleyi* Britt. & Rose, Contr. U. S. Nat. Herb. 12: 431. 1909. Near Limón, *Biolley* in 1899. Occasional in forests of the Atlantic tierra caliente; on both slopes of the mountains of Tilarán, Guanacaste; ascending to 1,000 meters (Naranjo). Endemic. Plants epiphytic, the long, slender, pendent stems 1–1.5 meters long, 4–6 mm. thick, terete or slightly angled, in juvenile plants often compressed or 3-winged, usually unarmed but sometimes with 1–3 small, yellow spines at an areole; flowers short-funnelform, the perianth segments obtuse, the inner ones pink, the ovary tuberculate, hairy. Illustrated, Britt. & Rose, Cact. *pl. 39, f. 2.*

Cereus calcaratus Weber, Bull. Mus. Hist. Nat. Paris 8: 458. 1902. *Hylocereus calcaratus* Britt. & Rose, Contr. U. S. Nat. Herb. 12: 428. 1909; Cact. 2: *f. 271.* Limón, *Pittier 20* in 1901. Forests of the Atlantic tierra caliente; sometimes cultivated in the Meseta Central. Endemic. A scandent epiphyte; stems 4–6 cm. wide, broadly 3-winged, green, the margins deeply rounded-lobate; areoles unarmed but bearing a few small, white bristles. Unlike other species of the subgenus *Hylocereus* in being spineless.

Cereus costaricensis (Weber) Berger, Kakt. 122. 1929. *Pitahaya. Cereus trigonus* var. *costaricensis* Weber, Bull. Mus. Hist. Nat. Paris 8: 457. 1902. *Hylocereus costaricensis* Britt. & Rose, Contr. U. S. Nat. Herb. 12: 428. 1909; Cact. 2: *f. 262.* Described from cultivated plants sent to Paris by Tonduz. Frequent on the Pacific slope, growing mostly on rocks in barrancas. Endemic. A large vine, the stems sometimes 10 cm. broad, normally 3-angled, green, purplish, or grayish, the 3 ribs rather thin, straight or somewhat undulate on the margins; spines 2–4 at an areole, short, stout,

brownish, accompanied by 2 white hairs or bristles; flowers 30 cm. long, fragrant, the outer segments narrow, somewhat reddish, the inner ones pure white; ovary covered with large, narrow scales; fruit purple-red, about 10 cm. long, with red pulp.

Cereus flagelliformis L. (*Aporocactus flagelliformis* Lem.), a common ornamental plant, probably is in cultivation in Costa Rica. It has long, slender, snaky stems with 10–12 ribs and very numerous slender spines; the showy flowers are crimson.

Cereus pentagonus L. (*Acanthocereus pentagonus* Britt. & Rose) probably grows in thickets along the Pacific coast. It is a terrestrial vine with stout, 3-angled stems armed with stout spines; the showy, white flowers are 14–20 cm. long.

Cereus stenopterus Weber, Bull. Mus. Hist. Nat. Paris 8: 458. 1902. *Hylocereus stenopterus* Britt. & Rose, Contr. U. S. Nat. Herb. 12: 429. 1909; Cact. 2: *f. 267; pl. 27, f. 3.* Valle de Tuis, *Tonduz 1909* and *1919* in 1898. Collected also at Tucurrique. Endemic. Sometimes cultivated in the Meseta Central. An epiphytic vine, the stems 4 cm. broad, light green, not glaucous, the 3 wings thin; spines 1–3 at an areole, small, yellow; flowers 10–12 cm. long, reddish purple, the segments linear; scales of the ovary orbicular or the upper ones narrowly ovate.

Cereus testudo Karwinsky. *Deamia testudo* Britt. & Rose. Reported from Costa Rica by Britton and Rose, without indication of the locality. Southern Mexico to Colombia. Plants epiphytic and scandent, attached closely to tree trunks by numerous stout roots, 3–10 cm. broad or even larger, the ribs thin, wing-like; spines 10 or more at an areole, 1–2 cm. long, brownish; flowers almost 30 cm. long, the slender tube 10 cm. long, the inner perianth segments linear-oblong, acuminate, 8–10 cm. long; scales of the ovary 1 mm. long or less, with brown hairs in their axils.

Cereus Tonduzii Weber, Bull. Mus. Hist. Nat. Paris 8: 459. 1902. *Werckleocereus Tonduzii* Britt. & Rose, Contr. U. S. Nat. Herb. 12: 432. 1909; Cact. 2: *f. 296; pl. 39, f. 3.* El Copey, 1,800–2,900 meters, *Tonduz 1915.* Known, apparently, only from the region of the type. Endemic. Plants epiphytic, the stems rather stout, much branched, 3- or rarely 4-angled, deep green, climbing by aerial roots, the margins of the angles nearly straight; areoles small, without spines but sometimes with weak bristles; flowers 8 cm. long or less, the areoles of the ovary bearing clusters of dark spines and short, black wool; outer perianth segments brownish, oblong, the inner

ones oblong, creamy white, 2.5 cm. long; fruit subglobose, yellow, 3–4 cm. in diameter, the pulp whitish.

Cereus Tunilla Weber, Bull. Mus. Hist. Nat. Paris 8: 460. 1902. *Tunilla. C.Gonzalezii* Weber, loc. cit. (Pacayas, *Alb.González*). *Weberocereus Tunilla* Britt. & Rose, Contr. U. S. Nat. Herb. 12: 432. 1909; Cact. 2: *pl. 39, f. 1.* Illustrated in Curtis, Bot. Mag. *pl. 8779.* Near Tablón, 2 leagues southwest of Cartago, 1,400 meters. Endemic in Costa Rica, the distribution not well known; often cultivated in the Meseta Central. Similar to *Cereus Biolleyi,* but the stems strongly 2–5-angled, 5–12 mm. in diameter; spines 6–12 at an areole, stiff, 6–8 mm. long; flowers 5–6 cm. long, pinkish, the outer segments linear, the inner ones oblong, acute; ovary strongly tuberculate, the tubercles bearing several yellow bristles.

Cereus undatus Haworth. *Pitahaya. Hylocereus undatus* Britt. & Rose. A species widely distributed through the tropics in cultivation, its native habitat uncertain. Often planted for ornament in the Meseta Central and elsewhere, especially along walls, and perhaps growing wild in some localities. Plants mostly terrestrial and clambering over shrubs, trees, or walls, the stems usually 3-angled, the angles wing-like, broad, thin, green, the margins strongly undulate, horny in age; areoles with 1–3 stout spines 2–4 mm. long; flowers as much as 30 cm. long, opening at night as in many or most related species, the inner segments pure white, oblanceolate; fruit red, 10–12 cm. in diameter, covered with large, foliaceous scales, containing numerous small, black seeds. The juicy fruit is delicious in flavor, like that of most of the Costa Rican species.

Cereus Wercklei Weber, Bull. Mus. Hist. Nat. Paris 8: 460. 1902. *Selenicereus Wercklei* Britt. & Rose, Cact. 2: 208. *f. 288, 289.* 1920. Cerro Mogote, near Miravalles, *Werclé.* Frequent in Guanacaste; region of San Ramón. Endemic. Plants slender, epiphytic, much branched, the stems pale green, 5–15 mm. in diameter, almost terete, with 6–12 faint ribs; areoles each bearing a small tuft of brownish felt but no spines; flowers 15–16 cm. long, bright red, the inner segments oblong; ovary spiny; fruit ovoid, yellow, with clusters of brown spines at the areoles.

EPIPHYLLUM Haworth

Plants epiphytic, the main stem often terete and woody, the branches usually flat and thin, leaf-like; areoles small, borne on the margins; spines mostly wanting in adult plants but on young branches

sometimes represented by slender bristles; flowers large, nocturnal or diurnal, the tube longer than the limb, rarely short; fruit large, red or purple, splitting open at maturity and exposing the white or crimson pulp and numerous small, black seeds.—Plants of this genus usually have exceptionally showy flowers, and are popular in cultivation in the North as well as in the tropics.

Epiphyllum Bradei (Britt. & Rose) Standl., comb. nov. *Eccremocactus Bradei* Britt. & Rose, Contr. U. S. Nat. Herb. 16: 262. *pl. 83.* 1913. *Phyllocactus Bradei* Vaupel, Monatsschr. Kakteenk. 23: 118. 1913. Cerro Turrubares near Orotina, *Maxon 21.* Endemic and probably confined to the Pacific slope. Illustrated, Britt. & Rose, Cact. 4: *pl. 20.* Plants epiphytic, the stems 5–10 cm. wide, obtuse, the margins shallowly crenate; areoles bearing 1–3 small, dark brown spines 6 mm. long or less; flowers 6–7 cm. long, the outermost segments pinkish, the inner ones oblong, white, obtuse, the tube 1 cm. long; scales of the ovary thick, purple, ovate, with short hairs in their axils. The plant is the only species of the genus *Eccremocactus* Britt. & Rose.

Epiphyllum cartagense (Weber) Britt. & Rose, Contr. U. S. Nat. Herb. 16: 256. 1913. *Platanillo de monte. Phyllocactus cartagensis* Weber, Bull. Mus. Hist. Nat. Paris 8: 462. 1902. *P. cartagensis* var. *refractus* Weber, loc. cit. *P. cartagensis* var. *robustus* Weber, Monatsschr. Kakteenk. 15: 180. 1905. Near Cartago, 1,400 meters, *Wercklé.* Collected also at Naranjo, and doubtless widely distributed in Costa Rica. Endemic. Joints short or elongate, 4–5 cm. wide, coarsely crenate, green; tube of the flower 10–15 cm. long, bearing a few short, distant scales, the outer perianth segments pink to yellowish, the inner ones 5–7 cm. long, white; fruit oblong, 7–8 cm. long or larger, very juicy.

Epiphyllum grandilobum (Weber) Britt. & Rose, Contr. U. S. Nat. Herb. 16: 257. 1913. *Phyllocactus grandilobus* Weber, Bull. Mus. Hist. Nat. Paris 8: 464. 1902. La Hondura de San José, *Wercklé* in 1900; *Pittier 11* from the same locality also is cited. Apparently collected elsewhere in the same region, also cultivated in the Meseta Central. In the original publication the elevation is given as 800 meters, doubtless in error. Probably endemic. Branches bright green, up to 25 cm. wide, the margins deeply lobed, the apex obtuse or rounded, the lobes rounded, 3–5 cm. long; flowers large, white, opening at night; fruit red.

Epiphyllum lepidocarpum (Weber) Britt. & Rose, Contr. U. S. Nat. Herb. 16: 257. 1913. *Tuna. Phyllocactus lepidocarpus* Weber, Bull. Mus. Hist. Nat. Paris 8: 462. 1902. Region of El Copey, 1,800–2,500 meters, *Wercklé 1916*. Collected also at Cartago and Vara Blanca. Endemic. Plants more or less woody, the younger branches flattened or sometimes 3-winged, 2–3 cm. wide, the margins deeply and narrowly lobate, the areoles with a small scale bearing in its axil short wool and a few bristles; fruit 9 cm. long, 4 cm. wide, purple, covered with long scales, the pulp white, acidulous, with agreeable flavor.

Epiphyllum macropterum (Lem.) Britt. & Rose. *Reina del baile. Phyllocactus costaricensis* Weber, Bull. Mus. Hist. Nat. Paris 8: 463. 1902 (based upon material from Río Virilla near San José, Río María Aguilar, and Uruca). (?)*P. macrocarpus* Weber, op. cit. 464 (Piedras Negras, *Wercklé; Pittier 12, 13*). *Epiphyllum costaricense* Britt. & Rose, Contr. U. S. Nat. Herb. 16: 256. 1913. Apparently frequent in the region of the Meseta Central, at least in cultivation. Britton and Rose report the species as confined to Costa Rica. Plants sometimes 2 meters long, the stems sometimes 10 cm. wide, thin, the margins horny, slightly indented, the areoles 4–6 cm. apart; flowers very large, somewhat curved, the scales of the ovary small, green, spreading, with long hairs in their axils; outer perianth segments narrow, salmon or with yellow tips, 10 cm. long, the inner ones pure white, 8–9 cm. long, 2–3 cm. wide, the tube 10–12 cm. long.

Epiphyllum oxypetalum (DC.) Haworth. *Reina del baile, Chililllo. Phyllocactus oxypetalus* Link; *P. latifrons* Link; *Epiphyllum acuminatum* Schum. Cultivated in the Meseta Central and perhaps also native in the forests. Mexico to Brazil. Plants large, sometimes 3 meters long or more, the branches flat and thin, 10–12 cm. wide, long-acuminate, deeply crenate; flowers nocturnal, fragrant, the tube 13–15 cm. long, bearing distant, narrow scales 1 cm. long; outer perianth segments narrow, reddish to amber-colored, 8–10 cm. long, the inner ones oblong, white.

Epiphyllum Pittieri (Weber) Britt. & Rose, Contr. U. S. Nat. Herb. 16: 258. 1913. *Phyllocactus Pittieri* Weber, Dict. Hort. Bois 957. 1898. Described from Costa Rica and presumably endemic here; frequent in forests of the Atlantic tierra caliente; Tilarán; region of San Ramón; Cartago, perhaps cultivated. Illustrated, Britt. & Rose, Cact. 4: *pl. 16, f. 2; pl. 18.* Plants large, the older stems terete, the branches flat and thin, mostly 5 cm. wide or less,

the margins coarsely toothed or crenate; flowers rather small, the tube 8 cm. long, white or greenish white, bearing a few red, ascending scales; outer perianth segments 4–4.5 cm. long, narrow, yellowish green, acute, the inner ones white, slightly shorter than the outer ones; ovary with a few red scales; fruit dark red, 2 cm. long, the seeds dull black.

Epiphyllum strictum (Lem.) Britt. & Rose perhaps occurs in Costa Rica, since the species ranges from Mexico to Panama, but no records of its occurrence there are at hand.

HARIOTA DC.

The three species of this genus are natives of Brazil.

Hariota salicornioides (Haw.) DC. *Hatiora salicornioides* Britt. & Rose. Cultivated in gardens of the Meseta Central; native of southeastern Brazil. Said to have been introduced into Costa Rica by Alfredo Brade. Plants normally epiphytic, 1–2 meters long, much branched, the branchlets slender, clavate, 1.5–3 cm. long, the lower part of the joint slender and pedicel-like; areoles without spines or setae; flowers 8–10 mm. long, waxy in texture, salmon-colored, the sepals short and obtuse, the inner petals obtuse, somewhat crenate.

NOPALEA Salm-Dyck

Nopalea cochenillifera (L.) Salm-Dyck. *Tuna.* Frequently cultivated for ornament, from the Meseta Central to the coasts, perhaps naturalized in some localities. Widely distributed in cultivation in tropical America, the original habitat uncertain but probably in southern Mexico. Plants tall, erect, the stems or joints similar to those of *Opuntia,* rather narrow, green, with few or no long spines; flowers small, red, the perianth segments erect, not spreading as in *Opuntia;* stamens long-exserted. This, the cochineal cactus, was formerly of great importance in Mexico and elsewhere as a host plant for the cochineal insect, from which was obtained a handsome, red or purple dye. Large plantations of the plant existed in Mexico for production of the dye, and it was cultivated also in other regions of the earth for the same purpose.

OPUNTIA L. Prickly pear

The largest genus of the family, consisting of about 250 species, in both temperate and tropical regions of America, the center of distribution probably in Mexico. The group is sparsely represented

in Central America. The plants are well distinguished by the curious stems or joints, broad and flattened in the Central American species, and usually well armed with long, slender, very offensive spines having at their bases dense tufts of stiff hairs or glochids that penetrate the skin easily. In Mexico the genus is important economically as a source of food, the fruits of certain species being consumed in large quantities. The young, tender joints often are cooked and eaten as a vegetable.

Opuntia elatior Mill. *Tuna.* Thickets of the Pacific coast, probably common. Ranging to Venezuela. Plants erect, usually a meter high or less, the joints obovate to rounded or oblong, mostly 10–20 cm. long, the spines 2–8 at an areole, acicular, yellow or brown, 2–5 cm. long; flowers yellow striped with pink, about 5 cm. wide; fruit obovoid, reddish, the pulp dark red. It is possible that still other species of the genus grow wild on the Pacific slope.

Opuntia Ficus-indica L. *Tuna.* Reported as in cultivation in the Meseta Central and elsewhere. Widely distributed in tropics of both hemispheres, of American origin, but the original habitat uncertain. This species became thoroughly naturalized long ago almost throughout the Mediterranean region and in southern Africa. Plants large and shrub-like, or sometimes even tree-like and with a definite trunk, the joints mostly oblong and 30–50 cm. long; areoles small and usually without spines; flowers bright yellow, 7–10 cm. wide; fruit red, 5–9 cm. long. The juicy fruits are edible, and are sometimes eaten in Costa Rica, as in most other regions where the plant grows.

PERESKIA Mill.

Other species of the genus are known from Central America, and it is possible that more than one occurs in Costa Rica.

Pereskia nicoyana Weber, Bull. Mus. Hist. Nat. Paris 8: 468. 1902; Pittier, Pl. Usual. *pl. 2;* Britt. & Rose, Cact. 1:*f. 5. Mateares.* Nicoya, *Tonduz.* Frequent in thickets of the Pacific coast; sometimes cultivated about San José; often planted for hedges in the Pacific tierra caliente. Endemic. A bushy tree about 8 meters high with smooth, brown bark, the branches more or less armed with long, slender spines; leaves fasciculate or alternate, lanceolate or ovate to obovate, short-petiolate or almost sessile, fleshy, bright green; flowers reddish yellow, the petals fimbriate; ovary pyriform, bearing 8–12 spreading leaves. Among the Costa Rican cacti this is easily recognized by its large, green leaves, making it quite unlike the more

usual forms in general appearance. Species of this genus are much used along the whole Pacific coast of Central America as hedge plants. For this purpose they are certainly efficient, but they have many disadvantages, and their extensive planting is to be deplored.

RHIPSALIS Gaertn.

Slender, epiphytic plants, often much branched, pendent, the branches terete, angled, or sometimes flat and thin, unarmed; areoles bearing tufts of hairs, wool, or bristles; flowers mostly solitary from the areole, sometimes several, very small, the perianth segments few; stamens few or numerous; fruit small, globose or oblong, juicy, white or colored, usually naked, containing few or many small seeds.

Rhipsalis Cassutha Gaertn. Frequent on tall trees in the Atlantic tierra caliente, ascending to the region of Cartago, perhaps to 1,500 meters; Atlantic slopes of the mountains of Tilarán. Distributed almost throughout tropical and subtropical America, and in Ceylon and tropical Africa. Plants usually much branched and often forming large, pendent masses on trees, the slender branches terete, mostly 3–5 mm. thick, the young areoles with a few white bristles at the areoles; petals only 2 mm. long, cream-colored; fruit translucent, white or pink, globose, 5 mm. in diameter, maturing in only a few days after anthesis.

Rhipsalis coriacea Polak. Linnaea 41: 562. 1877. *Hariota coriacea* Kuntze, Rev. Gen. 1: 262. 1891. *R. angustissima* Weber, Bull. Mus. Hist. Nat. Paris 8: 465. 1902 (Cachí, 1,000 meters, *Biolley* in 1902). *R. leiophloea* Vaupel, Zeitschr. Sukkulentk. 1: 20. 1923 (San José, *Hoffmann 498;* photo. of type in Herb. Field Mus.). Illustrated, Bull. Mus. Hist. Nat. Paris 8: 466; Britt. & Rose, Cact. 4: *pl. 32, f. 4.* Near Cartago, *Polakowsky 156.* Frequent in the temperate region, at least about the Meseta Central, reaching the upper parts of the Atlantic tierra caliente; Atlantic slopes of the mountains of Tilarán; sometimes cultivated about the Meseta Central. Probably extending to Guatemala and British Honduras. Plants often a meter long, the branches rather few, usually pendent, flat, 1–3.5 cm. wide, shallowly crenate, the crenations 1.5–2.5 cm. apart; areoles on young branches with 2–7 long bristles; flowers narrow, about 12 mm. long; petals greenish white or pinkish, obtuse, 7–8 mm. long; fruit white, 7 mm. in diameter. The species of *Rhipsalis* with flat branches are most unlike the common *R. Cassutha* in general appearance. If sterile they may be mistaken for species of

Epiphyllum. By Weber *R. coriacea* was reduced incorrectly to synonymy under *R. ramulosa* Pfeiff., a South American species.

Rhipsalis frondosa Wercklé, Subreg. Fitogeogr. Costar. 42. 1909, is a name only, without description.

Rhipsalis himantoclada Roland-Gosselin, Bull. Soc. Bot. France 55: 694. 1908. *Wittia costaricensis* Britt. & Rose, Contr. U. S. Nat. Herb. 16: 261. 1913. *Pseudorhipsalis himantoclada* Britt. & Rose, Cact. 4: 213. *f. 214; pl. 22, f. 6.* 1923. Type collected at Pozo Azul. Collected at various localities on the Pacific slope. Endemic. Plants often much branched and forming dense clumps, the joints attenuate toward the apex, flat, 1–3 cm. wide, the margins shallowly serrate; ovary, tube, and sepals purplish, the ovary 3 mm. long, bearing a few short scales; tube of the flower 8 mm. long, the inner perianth segments white, obtuse, spreading. Differs from other Costa Rican species of the genus in the distinct perianth tube.

Rhipsalis Simmleri Beauverd, Bull. Herb. Boiss. II. 7: 136. 1907. Described from plants cultivated at Geneva, of Costa Rican origin. Apparently not found recently in a wild state. Endemic. Similar to *R. Cassutha* but much more slender, the joints only 2–3 mm. thick, relatively short, terete, the uppermost ones more or less angled; petals white, with pink tips, 6–8 mm. long; fruit white.

Rhipsalis Tonduzii Weber, Dict. Hort. Bois 1046. 1898. Collected at Ochomogo, bridge of Río Tarrazú near San Marcos, Jiménez, and Piedras Negras, at 800–1,530 meters. Endemic. Illustrated, Britt. & Rose, Cact. 4: *pl. 30, f. 3.* Plants branched and pendent, the branches mostly 4–5-angled but sometimes 3- or 7-angled, or even flattened, the margins crenate, the areoles rather close together; flowers 12 mm. long, white; fruit subglobose, white, 7–10 mm. long, the numerous seeds black.

Rhipsalis Wercklei Berger, Monatschr. Kakteenk. 16: 64. 1906. Navarro, *Wercklé.* Closely related to *R. Tonduzii,* from which Britton and Rose were unable to distinguish it, although they did not reduce it to synonymy; branches 2–4-angled, 8–10 cm. long, 1 cm. wide or less; flowers small, the sepals 2, the petals 4, creamy white; fruit white, globose, naked or with a few small scales, 5 mm. long.

ZYGOCACTUS Schum.

The genus consists of a single species.

Zygocactus truncatus (Haw.) Schum. *Bailarina.* Often grown for ornament in Costa Rica; native of eastern Brazil. Plants

much branched, bright green, the joints flattened, short, sharply serrate, unarmed; flowers terminal, 6–7 cm. long, asymmetric, the tube 2 cm. long; inner perianth segments scarlet to white, oblong, obtuse to acute, reflexed; fruit obovoid, 1.5–2 cm. long, purple. A handsome plant that often flowers freely in cultivation. Known in the United States by the name Christmas cactus.

THYMELAEACEAE. Mezereum Family

The family is represented in the countries of Central America by only a single genus.

DAPHNOPSIS Mart. & Zucc.

Trees or shrubs; leaves alternate, entire, more or less coriaceous, without stipules; flowers small, by abortion dioecious, umbellate or subracemose, the inflorescence axillary or terminal; perianth of the staminate flower with a slender tube and 4 spreading lobes; stamens 8, half of them inserted on the perianth lobes, the other 4 in the throat, the anthers sessile; pistillate perianth smaller, turbinate or urceolate; style short, the stigma capitate; fruit subglobose, 1-seeded, drupaceous, with a thin pericarp.—A few other species are known from Central America, principally in Guatemala.

Daphnopsis Seibertii Standl. *Mastate.* Region of San Ramón and slopes of Volcán de Barba, at 1,000–2,400 meters, in forest. Also in Panama. A tree of 7–12 meters, the crown rounded; branchlets rather stout, glabrous or the youngest ones somewhat sericeous; leaves short-petiolate, narrowly oblong-lanceolate or oblong-oblanceolate, 8–15 cm. long, 2.5–4.5 cm. wide, acute to long-attenuate at the apex, acute or acuminate at the base and long-decurrent to the petiole, glabrous above or when young sparsely pilose with long and very slender hairs, beneath sparsely strigose or almost wholly glabrous; staminate flowers capitate, the heads long-pedunculate, numerous, cymose, densely strigose or sericeous; perianth white, about 8 mm. long, densely sericeous, the short lobes spreading or reflexed; pistillate calyx only 4 mm. long; drupes green or yellowish, when fresh 1 cm. long and 6–7 mm. thick, glabrate. The bark, as often is the case in this family, is said to be fibrous and somewhat lace-like or net-like when separated from the trunk. This doubtless explains the local name of Mastate, given to Costa Rican Moraceae whose bark is or was formerly used by the Indians for making bark cloth.

LYTHRACEAE. Loosestrife Family

Reference: Koehne in Engler, Pflanzenreich IV. 216. 1903.

Herbs, shrubs, or trees; leaves opposite, verticillate, or alternate, entire, the stipules minute or none; flowers perfect, the pedicels generally bibracteolate; calyx tubular to campanulate, the lobes or teeth valvate; petals inserted in the throat of the calyx between the lobes; stamens inserted in the calyx tube; fruit capsular.—There are several other genera in Central America, and probably some of them reach Costa Rica.

ADENARIA HBK.

A genus composed of a single species.

Adenaria floribunda HBK. Thickets of the Atlantic coast. Mexico to South America. A shrub or small tree, covered throughout with black dots; leaves opposite, almost sessile, elliptic-lanceolate, 3–10 cm. long, somewhat pubescent beneath; flowers small, whitish, in small, axillary cymes, with 4 or 5 petals; calyx 3–4 mm. long; stamens 7–12. The wood is yellow and fine-grained.

CUPHEA Adans.

Small plants, herbaceous or sometimes more or less woody; leaves small, opposite or ternate; flowers axillary or racemose; calyx tubular, sometimes with a short spur at the base, the teeth very short; petals 6, 2, or none; stamens 11 or 9; ovary with a disk at its base; capsule 1-celled, with few or numerous seeds.—Other species occur in Central America. The genus is best developed in Mexico, where the species are very numerous.

Cuphea calophylla Cham. & Schlecht. *C. microstyla* Koehne. Very common in the central region, at 1,100–2,200 meters, growing in pastures, thickets, or forests. Mexico to Brazil. An erect, perennial herb, occasionally somewhat woody, branched, the branches pubescent; leaves almost sessile, 1–5 cm. long, lanceolate or ovate-oblong, acute, rough; pedicels 1.5–6 mm. long; calyx tubular, 6 mm. long, hispidulous, scarcely swollen; petals purple, conspicuous.

Cuphea carthagenensis (Jacq.) Macbride. *C. Balsamona* Cham. & Schlecht. Common in cultivated and waste ground of the Meseta Central, and almost throughout the Atlantic slope; region of San Ramón. Widely distributed in tropical America. Plants 50 cm. high or less, glandular-pilose, usually branched; leaves petiolate, obovate or elliptic, 2–5 cm. long, acute, rough; pedicels scarcely 1 mm.

long; calyx 4.5–6 mm. long, conspicuously swollen; petals very small, purple.

Cuphea epilobiifolia Koehne. *C. epilobiifolia* var. *costaricensis* Koehne, Bot. Jahrb. 1: 457. 1881; *C. epilobiifolia* f. *canescens* Koehne, Bot. Gaz. 20: 4. 1895; *C. epilobiifolia* f. *Hoffmannii* Koehne, Pflanzenreich IV. 216: 112. 1903; *C. epilobiifolia* f. *Endresii* Koehne, Pflanzenreich IV. 216: 113. 1903. Swampy places of the Atlantic tierra caliente; San Ramón, at 1,000 meters. Panama and Venezuela. Plants erect, sometimes somewhat woody; leaves sessile, narrowly lanceolate, narrowed toward the base and apex, 6–9 cm. long or larger, not rough; pedicels 2–5 mm. long; calyx swollen, 6–9 mm. long, densely pubescent; petals small, purple.

Cuphea hyssopifolia HBK. Reported from Sarapiquí. Extending to Mexico. Plants erect and woody, densely branched; leaves sessile, 8–15 mm. long, linear, glabrous; pedicels 3–7 mm. long; calyx tubular, not swollen, 7–8.5 mm. long, glabrous; petals purple, conspicuous.

Cuphea infundibulum Koehne in Mart. Fl. Bras. 13, pt. 2: 236. 1878 (type from Costa Rica). *C. infundibulum* var. *foliosa* Koehne, Bot. Jahrb. 7: 43. 1885 (Turrialba, 925–1,250 meters, *Kuntze 2170*). Common in forests of the central region, ascending to 2,450 meters, and descending to the tierra caliente of both slopes; region of San Ramón. Also in Panama. Plants slender, erect or ascending, as much as 1 meter high; leaves petiolate, oblong or lanceolate, 3–15 cm. long, acuminate; pedicels 2–4 mm. long; calyx narrow, 2.5–3.5 cm. long; petals large, red, rarely orange.

Cuphea utriculosa Koehne. *Quiebra-piedras, Canchalagua.* Region of San José to the Pacific coast, common in many localities, growing almost always on rocks at the edge of streams; region of San Ramón. Panama to Mexico. Plants somewhat woody, less than 1 meter high, often forming dense clumps; leaves sessile, 1–3.5 cm. long, oblong-lanceolate or linear, glabrous; pedicels 6–15 mm. long; calyx glabrous, 4–6 mm. long; petals small, purple. Pittier reports the Brunka name of Tsú-krá. Koehne reported for Costa Rica two forms, *ciliifolia* and *communis*, which have little apparent systematic importance.

Cuphea Wrightii Gray. Pastures of the central region. Ranging to southwestern United States. Plants erect, annual, glandular-pilose; leaves oblong to ovate, 2–4 cm. long, rough, petiolate; pedicels

1.5–5 mm. long; calyx swollen, 5 mm. long, purple, hispidulous; petals small, purple.

LAGERSTROEMIA L.

Lagerstroemia indica L. *Júpiter.* An ornamental shrub, native of India, cultivated in some localities. The flowers are white, pink, or purple. The English name is crape myrtle.

LAFOENSIA Vandelli

A single species is known from North America.

Lafoensia punicifolia DC. Collected only along the Río Tuis. Mexico to Bolivia. A tree of 5–15 meters, glabrous; leaves opposite, oblong-lanceolate, with a large pore at the blunt apex on the lower surface; flowers large, the calyx 2.5 cm. long, green, the stamens very numerous and elongate, red; petals yellowish; capsule ovoid, 3–4 cm. long, the seeds broadly winged. The wood is yellow, rather hard, heavy, strong, and fine-grained. The tree is known in Panama by the name Amarillo.

LAWSONIA L. Henna

Lawsonia inermis L. *Reseda.* An ornamental shrub, native of Africa and Asia, grown in gardens of the hot and temperate regions on account of its very fragrant, although small and inconspicuous flowers. From this plant is obtained the henna of the Orient, employed for coloring hair and other substances. The shrub should not be confounded with the true *reseda* of Spain, which is an annual plant with similarly fragrant flowers (mignonette; *Reseda*), cultivated commonly in European gardens, and perhaps in those of Costa Rica.

PUNICACEAE. Pomegranate Family

The family consists of a single genus and species.

PUNICA L. Pomegranate

Punica Granatum L. *Granada.* Planted frequently in the temperate regions for its fruit. Native of the Mediterranean region. The pomegranate, which is not strictly a tropical plant, since it is hardy in the United States as far north as the city of Washington, is grown much less abundantly in Central America than in Mexico. The bark, an official drug of the United States Pharmacopoeia, is employed in Costa Rica for expelling intestinal parasites. It is rich in tannin, and is sometimes used, like the rind of the fruit, for

tanning fine leather. The juicy pulp is utilized in Central America for preparing refreshing beverages.

LECYTHIDACEAE. Brazil-nut Family

Reference: Pittier, The Lecythidaceae of Central America, Contr. U. S. Nat. Herb. 26: 1–14. *pl. 1–12.* 1927.

Trees, often very large, the leaves simple, alternate, not gland-dotted but sometimes with large glands on the margins; stipules none; flowers mostly large and showy, actinomorphic or zygomorphic, perfect; calyx 4–6-lobate, the lobes valvate or somewhat imbricate; petals 4–6, free or partly united; stamens numerous, in several series, the outer ones often modified into staminodia and resembling a corona; filaments mostly united and often arranged on one side of the flower, the anthers basifixed, opening at the side by a slit; ovary partly or wholly inferior, with 2 or more cells, the ovules 1 to many; fruit woody, fibrous, or fleshy, indehiscent or opening at the apex by an operculum or lid; seeds without endosperm.—Best known among representatives of this family are *Bertholletia excelsa* HBK. of Brazil, which supplies the Brazil nuts of commerce; and *Lecythis usitata* Miers and *L. Ollaria* L., of the same country, that supply sapucaia nuts. Other genera represented in Central America are *Grias* and *Gustavia.* In America the family is chiefly Brazilian, and most of the few species reaching Central America are not found above Panama, although the family is represented as far north as British Honduras.

COUROUPITA Aubl. Cannon-ball tree

Large trees; leaves mostly cuneate-oblong, entire or nearly so; flowers large and showy, in simple, often large racemes arising from the trunk or larger branches; calyx 6-lobate; petals 6, unequal; stamens very numerous, in many series, the staminiferous disk elongate to form a somewhat fleshy, more or less petal-like ligule; ovary semisuperior, 5–7-celled, the ovules numerous; fruit very large, globose, woody, indehiscent, filled with numerous large, irregular, closely packed seeds.—Two other Central American species are known in Panama.

Couroupita nicaraguensis DC. Salinas Bay and Nicoya, collected only by Pittier. Also in Nicaragua. A large tree with a tall, straight trunk and large, rounded crown; leaves large, obtuse; flowers large, borne on the trunk and larger branches, 7.5 cm. wide; outer petals slightly smaller than the 3 inner ones, 2–3.5 cm. long, pinkish white; fruits large, globose, solitary or clustered.

Couroupita parviflora Standl. Field Mus. Bot. 4: 238. 1929. Type collected in the Changuinola Valley, Panama (*Cooper & Slater 11*), near the Costa Rican border, and doubtless extending into Costa Rica. A tall tree; leaves short-petiolate, cuneate-obovate, 14–19 cm. long, broadly rounded at the apex, cuneate-attenuate to the base, entire, barbate beneath in the axils of the nerves, otherwise glabrous; racemes paniculate, 5–20 cm. long, many-flowered, the flowers short-pedicellate; sepals 6, broadly ovate, rounded at the apex, 5 mm. long; petals unequal, rounded, glabrous, 1.5 cm. long.

ESCHWEILERA Mart.

Medium-sized trees, the leaves entire; flowers small or rather large, in simple or paniculate racemes borne at or near the tips of the branches; calyx lobes usually 6, imbricate; petals commonly 6, unequal; androecium expanded on one side into a ligule, the stamens of the ligule mostly sterile; ovary inferior or semisuperior, 2–6-celled; fruit rather small, coriaceous, opening by a lid-like operculum, the seeds small, sessile, erect.—Four other species are known from Panama.

Eschweilera calyculata Pittier, Contr. U. S. Nat. Herb. 12: 97. *pl. 1, 2.* 1908; op. cit. 26: *pl. 11.* Forests between Limón and Moin, *Pittier 16008.* Stated by Pittier to be not infrequent on the Atlantic coast, at 100 meters or less. Also in Panama. A tree of 8–15 meters, the trunk 40 cm. in diameter, the crown elongate; leaves short-petiolate, elliptic-oblong, 10–35 cm. long, 4–12 cm. wide, abruptly short-acuminate, rounded or obtuse at the base, glabrous; racemes terminal or axillary, many-flowered, the flowers pale yellow, almost sessile; sepals coriaceous, accrescent in age and persistent at the base of the fruit; ovary 2-celled; fruit depressed, 7 cm. wide, 6 cm. high, thin-walled, opening by a shallow lid; seeds 3–5 in each cell.

Eschweilera Collinsii Pittier, Contr. U. S. Nat. Herb. 12: 97. *pl. 3; f. 1.* 1908. Plains of San Carlos, *Cook & Doyle 95.* Known only from the original collection. Leaves short-petiolate, lanceolate, 19 cm. long, 5.5 cm. wide, gradually long-attenuate, broadly cuneate at the base, glabrous; racemes large, 15–20-flowered, the flowers almost sessile; fruit 10 cm. broad, about 9 cm. high, the operculum very shallow and almost flat; sepals not persisting at the base of the fruit but concrete with it; seeds large, 1–3 in each cell.

LECYTHIS Loefl.

In Central America the genus is represented by five species, the others in Panama.

Lecythis costaricensis Pittier, Contr. U. S. Nat. Herb. 12: 99. *pl. 6–8.* 1908; op. cit. 16: *pl. 10. Olla de mono.* La Sedina, Plains of San Carlos, *Cook, Collins & Pittier.* A tall tree, the trunk 25 meters high and 1 meter in diameter, the branches widely spreading; leaves almost sessile, oblong-lanceolate, subcordate at the base, long-acuminate, serrate; fruit globose, 4-celled, 16 cm. in diameter, 15.5 cm. high, the basal part hemispheric, cup-shaped, the interzonal band 5.5 cm. wide; operculum dome-like, 2.7 cm. high, 9.5 cm. in diameter; calycary zone with 6 distinct protuberances corresponding to the sepals; walls woody and nearly 2 cm. thick; seeds fusiform, 4–5 cm. long, typically 9 in each cell, attached by a thick, fleshy funicle. The tree seems to be rather widely scattered in the Atlantic tierra caliente, according to reports and observations, the writer having seen it only along the lower Reventazón, where there were said to be but few trees. The hard wood is used in making carts. The seeds are said to be much like Brazil nuts in flavor, and are much sought by squirrels, monkeys, and men, but the supply, of course, is insignificant. Endemic.

RHIZOPHORACEAE. Mangrove Family

Trees or shrubs, usually glabrous; leaves opposite and stipulate, petiolate, coriaceous, entire or dentate; stipules inserted between the petioles, united in pairs, soon deciduous; flowers commonly perfect, solitary, the calyx epigynous or hypogynous, the 3–14 sepals valvate, persistent; petals as many as the sepals, often unguiculate, the limb usually lobate or fimbriate; stamens usually numerous, inserted on a disk; ovary inferior or free, 2–5-celled, or the partitions evanescent and the ovary 1-celled; style simple; ovules usually 2 in each cell; fruit leathery or fleshy, crowned by the calyx, indehiscent or opening septicidally by valves, 1-celled and 1-seeded or 2–5-celled with 1 seed in each cell.—The following genera are the only ones represented in North America.

CASSIPOUREA Aubl.

Glabrous shrubs or small trees; leaves entire or dentate; flowers small, solitary or fasciculate in the leaf axils, white, short-pedicellate, articulate with the pedicels; calyx perigynous, free, campanulate, 4–5-lobate, densely sericeous within; petals 4–5, fimbriate; stamens

10–40; ovary glabrous or densely sericeous, 3–4-celled, sometimes 1-celled; style simple, the stigma 3–4-lobate; fruit ovoid, somewhat fleshy, 3–4-celled, at last opening septicidally; seeds arillate.—No other species are known from Central America.

Cassipourea elliptica Poir. Cocos Island and perhaps also on the mainland. Of rather wide distribution in tropical America. A small tree, sometimes 10 meters high; leaves short-petiolate, the blades elliptic, 6–8 cm. long, acute or acuminate, cuneate at the base, entire or nearly so; flowers in fascicles of 3–5, the stout pedicels about 5 mm. long; calyx 5–6 mm. long, more or less sericeous, lobate to about the middle, obtuse and not constricted at the base, the lobes acute; petals with filiform, villous lobes, white.

Cassipourea macrodonta Standl. Field Mus. Bot. 4: 242. 1929. Changuinola Valley, near the Costa Rican border, *Dunlap 563*. Known only from the general region of the type. Collected in Costa Rica at La Palma, Sixaola Valley. A tree 7 meters high, the trunk 10 cm. in diameter; leaves short-petiolate, rather thin, ovate-elliptic or lance-ovate, 9.5–11.5 cm. long, long-acuminate, acute or obtuse at the base, coarsely and remotely serrate; flowers densely fasciculate in the leaf axils, the pedicels 1–2 mm. long; calyx sparsely strigillose outside, abruptly contracted into a short stipe, 4.5 mm. long; ovary glabrous. Easy of recognition because of the large teeth of the leaves.

Cassipourea podantha Standl. Forests near Tilarán, Guanacaste, and probably in the Atlantic tierra caliente. Panama to British Honduras. A shrub or tree, as much as 18 meters high, with a trunk 30–45 cm. in diameter; leaves short-petiolate, the blades oblong-elliptic or lance-oblong, 8.5–12.5 cm. long, abruptly long-acuminate, entire or nearly so; pedicels fasciculate, few, 2–3 mm. long; calyx glabrous outside, 3.5–4 mm. long, abruptly contracted at the base into a short stipe, the lobes ovate, acute; ovary sericeous. Called Goatwood in Panama and Water-wood in British Honduras. The thick sapwood is yellowish, the heartwood pale brown, moderately heavy, tough, strong, splintery, rather fine-textured; it finishes smoothly and is fairly durable. In Panama the wood is said to be used for piling, and in British Honduras for railway crossties and house frames.

RHIZOPHORA L. Mangrove

In North America the genus is represented by a single species.

Rhizophora Mangle L. *Mangle.* Abundant on both coasts, forming characteristic *manglares* of great extent that consist prin-

cipally of this tree, and extend into the margins of the sea. Generally distributed on tropical American coasts. A small or medium-sized tree with thin, brownish gray, shallowly furrowed bark, and often numerous stilt roots; leaves short-petiolate, elliptic, very thick, dark green. One of the most curious and characteristic trees of tropical regions, important because of its agency in land building. The flowers and fruits are of curious and distinctive structure, the seeds usually germinating upon the tree, then falling so as to become fixed upright in the mud, where they quickly develop and take root. The conspicuous prop roots often are exposed at high tide, when they are seen to be covered with oysters and other marine animals. The wood is red or reddish brown, very hard and heavy, strong, fine-textured, and durable. It is considered one of the best sources of charcoal, and is used to some extent for construction. The bark is utilized for tanning leather.

COMBRETACEAE. Combretum Family

Trees or shrubs, sometimes scandent or armed with spines; leaves opposite or alternate, entire, without stipules; flowers in racemes, spikes, or heads, perfect or polygamo-dioecious; calyx tube united with the ovary, the limb 4–5-lobate; petals 4 or 5 or none, small; stamens as many or twice as many as the calyx segments, inserted on the limb or at the base of the calyx; style simple, the stigma entire; fruit coriaceous or drupaceous, 1-celled, 1-seeded, indehiscent.

BUCIDA L.

Another Central American species is found in Guatemala.

Bucida Buceras L. Thickets of the Atlantic coast, growing along the beaches. Widely distributed in tropical America. A tree about 6 meters high, sometimes branched from the base, almost glabrous, the branchlets often with 2 or 3 spines at the tip; leaves clustered at the ends of the branches, obovate or oblanceolate, obtuse or rounded at the apex, narrowed to the base; flowers small, in pedunculate spikes in the leaf axils; fruit an ovoid drupe 6 mm. long. The wood is yellowish brown, hard, heavy, and fine-grained. It is said to be durable, and in some regions is employed for construction.

COMBRETUM L.

Scandent shrubs, sometimes armed with spines; leaves opposite, petiolate, entire; flowers polygamo-dioecious, spicate or racemose, the racemes often one-sided; calyx tube cylindric or angulate, con-

stricted above the ovary, the limb 4–5-lobate; petals 4 or 5, small; stamens 8 or 10, exserted; fruit coriaceous, with 4–6 longitudinal wings, 1-seeded.—Other species exist in Central America.

Combretum Cacoucia Exell probably grows in the Atlantic coast, since it is common both north and south of Costa Rica. It may be recognized by its erect, spire-like spikes of large, fiery red flowers.

Combretum erianthum Benth. Los Loros, *Brenes 22487*, and doubtless elsewhere on the Pacific coast. Extending to Mexico. A large, unarmed vine; leaves oblong or elliptic, 7–15 cm. long, obtuse to acuminate, lepidote beneath; spikes one-sided; calyx limb 4–5 mm. long, lepidote and pilose; fruits 2 cm. long. There has been reported from Costa Rica *C. Warszcewiczianum* Eichl., a synonym of this species, cited by its author from Costa Rica and Nicaragua, but the type in the Berlin herbarium was collected in Nicaragua.

Combretum farinosum HBK. *Papa miel. C. polystachyum* Pittier, Contr. U. S. Nat. Herb. 18: 243. 1917 (Currés, Río Diquís, near Boruca, *Pittier 1214*). Forests and thickets of the Pacific coast. Mexico to Panama, and probably to South America. A large, unarmed vine; leaves oval or elliptic-oblong, lepidote beneath; spikes one-sided, very dense, solitary or paniculate; flowers dark red or yellowish, very fragrant; calyx limb as much as 1 cm. long, lepidote but not pilose; fruits 2 cm. long, reddish. The flowers are full of sweet nectar, much sought by insects and hummingbirds. The plant is a showy and ornamental one when covered with its richly colored flowers.

Combretum nicoyanum Pittier, Contr. U. S. Nat. Herb. 18: 247. 1917. Near Nicoya, *Tonduz 13503*. Thickets of the Pacific coast. Endemic. A large vine, armed with long spines; leaves ovate or obovate, somewhat pubescent but not lepidote; flowers small, in large, terminal panicles; calyx limb 2 mm. long; spikes not one-sided; fruits glabrous, about 1.5 cm. long. This species probably is not distinct from *C. mexicanum* Humb. & Bonpl.

CONOCARPUS L.

Conocarpus erecta L. *Mariquito, Mangle negro.* Mangrove swamps of the coasts. Widely distributed in tropical America. A shrub or small tree; leaves alternate, oval to lanceolate, 3–10 cm. long, acute or obtuse, glabrous or nearly so, with 2 glands at the base; flowers very small, in dense heads 1 cm. thick, these arranged in racemes which are terminal or borne in the upper leaf axils. The

wood is fine-grained, heavy, and strong. In some regions it is employed for construction and for making charcoal. It is said that the bark is rich in tannin. The plant is one of the usual elements of the mangrove association.

LAGUNCULARIA Gaertn.

Laguncularia racemosa (L.) Gaertn. *Palo de sal.* Common in mangrove swamps of the coasts. A species of wide distribution. A shrub or small tree, the bark reddish brown; leaves opposite, petiolate, oblong or oval, 3–7 cm. long, rounded at the apex, coriaceous, glabrous, the petiole with 2 large glands; flowers small, in clustered spikes, the calyx 2–3 mm. long, sericeous; stamens 10; fruit a coriaceous, 10-costate drupe 1.5 mm. long. Called Mangle blanco in Panama. A characteristic tree of mangrove swamps. The wood is rather heavy, hard, strong, and yellowish brown. It is said to be durable, and in some regions it is employed for construction. The bark is rich in tannin.

TERMINALIA L.

Tall or medium-sized trees, the leaves alternate but often clustered at the tips of the branches, deciduous, petiolate; flowers small, green, perfect or polygamous, in elongate spikes; calyx tube constricted above the ovary, the limb campanulate, 5-dentate; petals none; stamens 10; fruit drupaceous and compressed, or coriaceous and longitudinally winged.—Another species is known from Central America.

Terminalia Catappa L. *Almendro, Alcornoque* (Nicoya). Perhaps the favorite shade tree in the parks of the tierra caliente, especially on the seacoast; naturalized in many places; Cocos Island. Native of the East Indies. A medium-sized tree, the branches verticillate; leaves obovate, 10–30 cm. long, rounded and short-pointed at the apex; drupes obovoid, 4–7 cm. long. The seeds are edible. The wood is hard, fine-grained, and reddish brown. The roots, bark, and fruits contain much tannin, and are utilized for tanning skins.

Terminalia chiriquensis Pittier. *Guayaba de montaña, Guayabón, Surrá.* Common in forests of the tierra caliente, especially in Guanacaste. Panama to Honduras. A tall tree, sometimes 45 meters high, often with broad buttresses, the bark smooth, pale brown, peeling in large sheets, the trunk slender; leaves oblong-oblanceolate, acuminate, narrowed to the base, almost glabrous; fruit coriaceous, with 2 wings about 2 cm. wide and of equal length.

It is probable that there occurs in Costa Rica also *T. obovata* (Ruiz & Pavón) Steud., in which the wings are only 5–6 mm. long.

MYRTACEAE. Myrtle Family

Trees or shrubs, usually aromatic; leaves opposite in the American genera, entire, without stipules, almost always pellucid-punctate; flowers perfect, regular, bibracteolate; calyx tube united with the ovary, the limb 4–5-lobate, the lobes sometimes united and circumscissile; petals 4 or 5 or none; stamens numerous; ovary with 2 or more cells, the style simple, the stigma capitate; fruit baccate or drupaceous, small or large, with 1 to many seeds.—A few other genera occur in Central America, at least in Panama. The group is easy to recognize by the opposite, entire leaves with numerous transparent dots.

CALYPTRANTHES Swartz

Trees or shrubs, glabrous or nearly so; flowers small, in axillary cymes or panicles; calyx tube turbinate, the sepals united and circumscissile as a cap; petals 1 or 2 or none; fruit a 2–3-celled berry, commonly 1–2-seeded.—Other species have been found in Central America. The genus is well marked by the circumscissile calyx.

Calyptranthes costaricensis Berg, Linnaea 27: 20. 1854. *Murta.* Type collected by Warscewicz in Costa Rica or Panama. Common in forests and thickets of the Meseta Central, at 1,100–2,000 meters. Endemic (?). A tree of 4–7 meters, the crown dense and rounded, the branchlets sericeous; leaves short-petiolate, elliptic or oblong-elliptic, 6–10 cm. long, acute or short-acuminate, almost glabrous; panicles shorter than the leaves, few-flowered, the flowers tomentulose, sessile, the buds 3 mm. long; berries about 1 cm. in diameter, yellow and red, edible. The wood is very hard.

Calyptranthes Pittieri Standl. Field Mus. Bot. 8: 143. 1930. Volcán de Poás, 2,600 meters, *Pittier 2034.* Leaves short-petiolate, thick and coriaceous, oblong-elliptic or broadly elliptic, 4–7 cm. long, acuminate, obtuse or acute at the base, almost glabrous; inflorescences cymose-paniculate, much longer than the leaves, many-flowered, the branches thick and compressed, the flowers sessile, sericeous, 3.5 mm. long.

Calyptranthes Tonduzii Donn. Smith, Bot. Gaz. 23: 245. 1897. *Murta.* Río Virilla, near San José, 1,100 meters, *Tonduz 9822.* Known only from the region of the type. Endemic. A small tree, the crown dense, rounded; leaves oblong-elliptic or obovate, 2.5–6.5

cm. long, acute or short-acuminate, acute at the base, glabrous; peduncles axillary, 3-flowered; berries yellow, 1 cm. in diameter.

EUCALYPTUS L'Hér. Eucalyptus

Eucalyptus globulus Labill. *Eucalipto.* Sometimes planted as a shade tree. Native, like most other species of the genus, of Australia. Leaves narrowly lanceolate, narrowed to an obtuse apex.

Eucalyptus robustus Smith. *Eucalipto.* Planted in some places in the Meseta Central. Leaves narrowed to a very slender, almost filiform apex. Probably other species of the genus are planted in Costa Rica.

EUGENIA L.

Shrubs or trees; flowers racemose, cymose, corymbose, or fasciculate in the leaf axils, sometimes solitary; calyx tube globose or turbinate, the limb usually 4-lobate, the lobes imbricate, generally rounded; petals 4, commonly white; fruit drupaceous or baccate, with 1 or few seeds; radicle very short.—Other species occur in Central America. The genus is a vast one, the largest of its family in America, but it is less abundantly represented in Central America than in the West Indies and certain parts of South America. Many of the species still are imperfectly known and separable with difficulty or uncertainty.

Eugenia cartagensis Berg, Linnaea 27: 240. 1854. *Turrú, Guayabillo, Turrusi, Murta.* Near Cartago, *Oersted 6* (photo. of type in Herb. Field Mus.). Common in forests and thickets of the central region, 1,400–1,800 meters; region of San Ramón, at elevations as low as 1,000 meters. Endemic. A shrub or tree of 3–9 meters, the bark smooth, the crown rounded; young branchlets puberulent or almost glabrous; leaves short-petiolate, oblong or oblong-lanceolate to narrowly elliptic, 3–5 cm. long, obtusely acuminate, glabrous; flowers in short, axillary racemes of 4–6 flowers, glabrous, the sepals very short; berries oval or globose, 1 cm. long, black at maturity.

Eugenia costaricensis Berg, Linnaea 27: 213. 1854. *Murta, Turrú, Cacique.* Type collected in Costa Rica or Panama by Warscewicz. Mountain forests of the central region, and in the mountains of Guanacaste; region of San Ramón; at 1,000–1,900 meters, and perhaps even higher. Endemic (?). A shrub or small tree, the young branchlets sparsely appressed-pilose; leaves short-petiolate,

elliptic-oblong, 4–6 cm. long, obtusely acuminate, glabrous; flowers in axillary umbels, the pedicels pubescent, 3–4 mm. long, the sepals small.

Eugenia Jambos L. *Manzana, Manzana rosa.* Planted commonly from the Meseta Central to the coasts, and naturalized in many localities. Native of southeastern Asia. A handsome tree with a dense, depressed crown; leaves large, narrowly lanceolate, glabrous; flowers terminal, large, with numerous long, white stamens; fruit globose, 3–4 cm. in diameter, whitish or yellowish, with few seeds, the flesh thin and firm. The fruit has a characteristic flavor, recalling rose water, and somewhat suggestive of highly scented toilet soap. It is little eaten except by children. This species is one of the handsomest shade trees of tropical regions, because of its elegant foliage.

Eugenia lepidota Berg, Linnaea 27: 226. 1854. *E. lepidota* var. *corymbosa* Berg, op. cit. 227. *E. lepidota* var. *pauciflora* Berg, loc. cit. Volcán de Barba, *Oersted* (photo. of type in Herb. Field Mus.). Forests of the slopes of Barba and Irazú; region of San Ramón, at 1,250 meters. Endemic. A shrub or small tree, the young branchlets lepidote and somewhat sericeous; leaves petiolate, obovate-oblong, 5–8 cm. long, acuminate, lepidote and somewhat sericeous beneath when young, later almost glabrous; flowers in short, few-flowered racemes, these short-pedunculate, the pedicels short, sericeous or lepidote; berries globose, 1 cm. in diameter, 1-seeded.

Eugenia leucadendron Berg, Linnaea 27: 202. 1854. Near Cartago, *Oersted.* Branches glabrous, whitish; leaves short-petiolate, oblanceolate-oblong, almost 20 cm. long, short-acuminate, glabrous; flowers fasciculate in the leaf axils, almost sessile; berries obovoid, 18 mm. long, sericeous, 1-seeded. I know this species only by a photograph of the type, which is preserved in the Copenhagen herbarium. I have seen no specimens that suggest the species.

Eugenia malaccensis L. *Manzana.* This species I have seen only in the Atlantic coast, where it is sometimes planted. Native of Asia. A tree similar to *E. Jambos,* but the flowers rose-purple and produced along the large branches, consequently not visible when the tree is viewed from a short distance; fruits pyriform, red, 5 cm. long, with an acid and very agreeable flavor.

Eugenia Oerstedeana Berg. Forests of the Pacific coast; region of San Ramón. Also in Nicaragua, where the type was col-

lected by Oersted. A shrub or small tree of 3–5 meters, the young branchlets somewhat sericeous or almost glabrous; leaves short-petiolate, elliptic-oblong or lance-oblong, 5–7 cm. long, narrowly acuminate, glabrous; flowers racemose the racemes axillary, 2–12-flowered, the pedicels slender, 6–8 mm. long; sepals conspicuous, spreading.

Eugenia oreinoma Berg, Linnaea 27: 158. 1854. *Carro caliente.* Candelaria and Ujarrás, *Oersted 23.* Frequent in forests of the region of San Ramón, at 1,000 meters or more. Panama (?). Young branchlets densely pubescent; leaves short-petiolate, ovate or elliptic, 10–14 cm. long, obtusely acuminate, obtuse or acute at the base, densely and softly pilose; pedicels axillary, solitary or fasciculate, pilose; berries globose, sometimes 2.5 cm. long, 1-seeded, pilose. Described by Brenes as a shrub or small tree.

Eugenia pacifica Benth. Bot. Voy. Sulph. 98. 1844. Cocos Island. Endemic. Branchlets puberulent or almost glabrous; leaves short-petiolate, ovate, 5 cm. long, subacuminate, acute at the base, glabrous; peduncles axillary, very short, few-flowered; berries oblong, 8–10 mm. long. Berg states that the leaves are similar to those of *Coffea arabica.*

Eugenia Pittieri Standl. *Cacique.* Common in thickets and forests of the mountains of Guanacaste, at 500–750 meters, also in the region of San José, at 1,150 meters; region of San Ramón, 950–1,100 meters. Panama. A slender shrub of 1–4.5 meters, the branchlets densely pubescent; leaves almost sessile, ovate to narrowly oblong, 4–5 cm. long, very shortly acuminate or sometimes obtuse, almost glabrous; flowers fasciculate, almost sessile; berries red, subsessile, 5–7 mm. long.

Eugenia sericiflora Benth. *Escobo.* Nicoya. Also in Panama. A small tree, the branchlets densely sericeous; leaves narrowly oblong-lanceolate, 4–7 cm. long, very narrowly attenuate or acuminate, somewhat sericeous when young; racemes axillary, with few or numerous flowers, densely sericeous.

Eugenia Siggersii Standl., sp. nov.—Arbor 4.5–6 m. alta omnino glabra, ramulis teretibus subferrugineis, novellis viridibus, internodiis elongatis; folia magna 5–8 mm. longe petiolata papyracea; lamina oblonga vel elliptico-oblonga circiter 14 cm. longa et 5 cm. lata, abrupte breviter obtuso-acuminata, basi acuta, in sicco laete viridis sublucida, costa subtus elevata gracili, nervis lateralibus utroque latere circiter 15 gracillimis prominentibus angulo lato diver-

gentibus ante marginem arcuato-junctis; flores axillares atque e nodis defoliatis nascentes fasciculati numerosi, pedicellis gracilibus 5–9 mm. longis; sepala patentia vel reflexa ovalia vel rotundata 2.5–3 mm. longa apice rotundata grosse punctata. Wet forest near Guápiles, Prov. Limón, 300–500 meters, *Standley & Siggers 37157* (Herb. Field Mus., type). A well marked species because of the form of its leaves, and because of the nature of the inflorescence, most of the flowers arising from the lower nodes of the branches.

Eugenia Skutchii Morton & Standl., sp. nov.—Arbor 18-metralis, ramulis crassiusculis teretibus vel subcompressis densissime minute cinnamomeo-tomentulosis, internodiis elongatis; folia inter majora breviter petiolata subcoriacea, petiolo crasso 1.5–2 cm. longo minute brunneo-tomentello; lamina lanceolato-oblonga vel anguste elliptico-oblonga 14–17 cm. longa 6–6.5 cm. lata acuta, apice ipso obtuso, basi acuta vel abrupte acuta et saepe solemniter obliqua, latere altero interdum 5 mm. breviore, supra in sicco griseo-viridis glabra, costa impressa, nervis venisque prominulis, subtus brunnescens ubique densissime minutissime tomentella, costa crassiuscula prominente, nervis lateralibus utroque latere ca. 18 angulo latiusculo divergentibus fere rectis teneris prominulis prope marginem in nervum collectivum paullo irregularem conjunctis, venulis prominulis laxe reticulatis, densissime minute pellucido-punctata; flores magni albescentes racemosi, racemis axillaribus solitariis ca. 5-floris, rhachi crassa minute cinnamomeo-tomentulosa, pedicellis crassis similiter tomentulosis 7–12 mm. longis, bracteis persistentibus late ovatis obtusis vel acutiusculis 2–3 mm. longis, bracteolis ad basin calycis 2 late rotundatis 3 mm. longis basi connatis; sepala late rotundata 6–7 mm. longa persistentia late imbricata utrinque dense tomentulosa; petala nulla; stamina numerosissima; stylus glaber fere 1 cm. longus.—Vicinity of El General, Prov. San José, 975 meters, August, 1936, *Alexander F. Skutch 2806* (type in U. S. Nat. Herb.; photo. in Herb. Field Mus.).

Eugenia Storkii Standl. Field Mus. Bot. 8: 143. 1930. *Guayabillo, Coquito. E. rigidissima* Cufodontis, Archivio Bot. 9: 198. 1933 (Volcán de Turrialba, 2,500 meters, *Porsch 758*). In a pasture on Volcán de Poás, 1,800 meters, *Stork 2501*. Common in forests of the central region, at 1,400–2,800 meters; region of San Ramón, at 1,000 meters or more. Endemic. A small tree of 3–8 meters, almost glabrous; leaves petiolate, coriaceous and thick, elliptic to rounded-obovate, 2.5–5 cm. long, obtuse or rounded at the apex, acute or

obtuse at the base; flowers in axillary, 3-flowered cymes, the central flower sessile, the lateral ones pedicellate. Easy of recognition among Costa Rican species because of the form of the inflorescence.

Eugenia truncata Berg, Linnaea 27: 157. 1854. *E. guanacastensis* Standl. Field Mus. Bot. 8: 144. 1930 (Los Ayotes, near Tilarán, *Standley & Valerio 45410*). Candelaria, *Oersted 22*. Common in forests of Guanacaste, also in the region of San Ramón, at 1,200 meters or less. Endemic. A shrub or small tree of 3–8 meters, the branchlets glabrous; leaves almost sessile, oblong or elliptic-oblong, 6–12 cm. long, acute or short-acuminate, rounded or somewhat cordate at the base, glabrous or along the costa pubescent; flowers fasciculate on naked branches, numerous, the pedicels 17–21 mm. long; sepals 4 mm. long, spreading.

Eugenia uniflora L. Planted in gardens of the Meseta Central, and in the Atlantic tierra caliente. Native of South America. A dense shrub, the leaves almost sessile, ovate, 2.5–4 cm. long, acuminate, glabrous; flowers clustered in the leaf axils, long-pedicellate; fruit depressed-globose, 2.5 cm. in diameter, 1-seeded. The fruits are red, sweet, aromatic, and of excellent flavor. The shrub is especially well adapted to cultivation as a hedge plant.

Eugenia Valerii Standl., sp. nov.—Frutex 2–3-metralis glaber, ramulis gracilibus ochraceis teretibus; folia parva graciliter 5–8 mm. longe petiolata subcoriacea; lamina oblongo-elliptica vel late elliptica 3–8 cm. longa 2–3.5 cm. lata abrupte longiacuminata, acumine angusto obtuso, basi obtusa vel acuta, supra in sicco cinereo-viridis opaca, costa impressa, dense puncticulata, subtus pallidior dense punctata, costa gracili elevata, nervis lateralibus utroque latere circiter 11 tenerrimis angulo acuto adscendentibus juxta marginem in nervum collectivum junctis; flores pauci axillares fasciculati breviter pedicellati, aperti non visi, pedicellis brevibus glabris; bacca breviter pedunculata globosa 1.5–2 cm. diam. monosperma.—Cerro de La Carpintera, 1,550 meters, *Stork 1077* (Herb. Field Mus., type). Between Aserrí and Tarbaca, Prov. San José, 1,200–2,500 meters, *Standley & Valerio 48099*. The species is known only from fruiting specimens, but it is easily recognized by its very large fruits. It is known also from the region of San Ramón, at 1,000 meters or more.

MELALEUCA L.

Melaleuca leucadendron L. *Corcho*. An ornamental shrub or small tree, cultivated in gardens of the Meseta Central. Native of

Australia. Leaves alternate, narrowly lanceolate, with conspicuous longitudinal nerves; flowers in terminal spikes.

MYRCIA DC.

Trees or shrubs, usually pubescent, at least in the inflorescence; flowers small, in axillary or terminal panicles of few or numerous flowers; calyx tube turbinate or semiglobose, the limb 5-lobate; petals 5; berry usually 2-celled; radicle of the embryo elongate.—Other species occur in Central America.

Myrcia carnea DC. La Palma de San José, 1,450 meters, and in the forests of the Atlantic coast. Also in the Guianas. A shrub, the branches almost glabrous; leaves very large, short-petiolate, lance-oblong, 15–30 cm. long, acuminate, obtuse or acute at the base, almost glabrous; calyx sericeous. The name used for this plant is the one given to it by Captain Smith, but I do not know whether the Costa Rican plant is the same as the one of the Guianas. If not, it should be described as a new species.

Myrcia costaricensis Berg, Linnaea 27: 104. 1854. *Murta, Guayabillo. M. discolor* Berg, Linnaea 27: 111. 1854 (type collected in Costa Rica by Oersted). Without exact locality, *Oersted* (photo. of type in Herb. Field Mus.). Common almost everywhere in the central region, in forests and thickets, at 1,000–1,900 meters; region of San Ramón; also in Guanacaste, at 600 meters. Panama, and probably of wide distribution in Central America. A shrub or tree of 2–8 meters, the crown dense and rounded, the young branchlets densely pilose with spreading, somewhat brownish hairs; leaves short-petiolate, lustrous, lance-oblong or elliptic-oblong, commonly 5–6 cm. long, shortly narrowed to an obtuse apex, soft-pubescent beneath; panicles densely pubescent, generally shorter than the leaves; flowers white. Called Arraiján in Panama.

Myrcia Oerstediana Berg, Linnaea 27: 113. 1864. *Murta, Mirto. M. melanoclada* Berg, loc. cit. (near Cartago, *Oersted 7*). Original specimens collected near Cartago and Turrialba by Oersted. Forests of the central region, common, chiefly at elevations of 1,200–2,400 meters, also in the Atlantic coast; region of San Ramón. Endemic (?). A shrub or tree of 3–9 meters, the crown dense and rounded, the young branchlets hispidulous with short, spreading hairs; leaves oblong-lanceolate or elliptic-oblong, generally 6–10 cm. long, narrowly attenuate to the narrow apex, somewhat pubescent beneath or almost glabrous; panicles large, pubescent, with numerous

flowers; fruits oval or almost globose, 1 cm. long, at first pink, purple or almost black at maturity.

Myrcia plicato-costata Berg, Linnaea 27: 114. 1854. *Murta.* Turrialba, *Oersted* (photo. of type in Herb. Field Mus.). Forests and hedges of the central region, at 1,100–1,500 meters, also in the Pacific coast, much less common than the two preceding species; region of San Ramón. Endemic. A small or medium-sized shrub with rounded crown, the young branchlets sericeous; leaves narrowly oblong-lanceolate, 5–10 cm. long, narrowed to the very narrow and attenuate apex, almost glabrous; panicles small, sericeous or almost glabrous; berries globose.

MYRTUS L.

To this genus belongs *Myrtus communis* L., the classical myrtle (mirto) of Europe.

Myrtus Oerstedii (Berg) Hemsl. Biol. Centr. Amer. Bot. 1: 407. 1880. *Arrayán. Ugni Oerstedii* Berg, Linnaea 27: 389. 1854. Common in meadows and forests of the central volcanoes, often growing in sphagnum, at 2,000–3,000 meters or higher. Probably also in Panama. A shrub or small tree, sometimes 6 meters high, sparsely pubescent or almost glabrous, densely branched; leaves ovate or elliptic, only 1.5 cm. long, acute, coriaceous; peduncles axillary, elongate, 1-flowered, somewhat recurved, the petals white or pink; fruits purplish black. Easy of recognition among Costa Rican Myrtaceae because of the very small leaves.

PIMENTA Lindl. Allspice

Pimenta officinalis Lindl. *Jamaica.* Planted in various parts of the temperate and hot regions. Probably imported from Mexico. A small tree, the bark pale brown and smooth, the crown dense; leaves petiolate, oblong or oval-oblong, 10–20 cm. long, rounded or obtuse at the apex, almost glabrous; flowers small, white, in axillary and subterminal cymes; sepals and petals 4; berry 1–2-celled, 1–2-seeded. The young fruits dried in the sun are the allspice (pimienta gorda) of commerce, a spice much used in Europe and North America. The tree exudes a delicious fragrance, which persists strongly in herbarium specimens many decades old.

PSIDIUM L. Guava

Trees or shrubs; flowers usually large, the peduncles axillary, 1–3-flowered; calyx limb 4–5-lobate, the lobes commonly completely

or partly united before anthesis; petals 4 or 5, white; fruits baccate, usually large and edible, 4–5-celled, with few or numerous seeds.—A few other species are described from northern Central America.

Psidium Cattleyanum Sabine. *Cas dulce.* Planted about Cartago and San José, and probably elsewhere. Native of Brazil. A shrub or small tree, as much as 5 meters high, the branchlets not angulate, glabrous; leaves obovate, 5–7 cm. long, obtuse or subacute, narrowed toward the base, coriaceous, glabrous; peduncles 1-flowered; ovary 4-celled; fruit obovoid or globose, 2.5–3.5 cm. long, purplish red, sweet and aromatic. The fruits are sometimes yellow.

Psidium Friedrichsthalianum (Berg) Niedenzu. *Cas, Cas ácido.* Frequent in cultivation everywhere in the temperate region, probably also wild in the central region and in the tierra caliente. Panama to Mexico. A tree of 5–12 meters, almost glabrous, the branchlets somewhat angulate; leaves petiolate, oblong or elliptic-oblong, acuminate, acute at the base; peduncles 1-flowered; calyx closed before anthesis; fruit oval or globose, small, acid. The bark is smooth and brown, the wood fine-grained and hard. Native names are Shorí (Cabécara); Kash-krá, Kurib-krá (Brunka); Kas (Térraba).

Psidium Guajava L. *Guayaba.* A shrub or small tree, well known in all tropical regions, native of America; planted and wild in almost all parts of Costa Rica up to an elevation of 1,400 meters or more. In some regions of the tierra caliente it forms characteristic thickets or *guayabales* of considerable extent. There are numerous local varieties, marked by the shape and color of the fruit. This is employed commonly in the preparation of a delicately flavored jelly or paste, which is one of the favorite desserts of Central America. The wood is hard and excellent for fuel. A decoction of the flower buds is reported to be an efficient remedy for diarrhea and bloody flux. Indian names noted by Pittier are: Shori (Cabécara); Shure (Bribrí); Shuib-krá (Brunka); Seuí (Térraba); Otera (Guatuso).

Psidium guineense Swartz. *Güisaro, Cas extrangero* (Alajuela). *P. Araca* Raddi; *P. molle* Bertoloni; *P. costaricense* Berg, Linnaea 27: 368. 1854 (Río Jarís, near Pacaya, *Oersted 17*); *P. molle* var. *gracile* Berg, Linnaea 27: 368. 1854 (Volcán de Irazú, *Oersted*); *P. laurifolium* Berg (Nicaragua). Very common in pastures and fields of the tierra templada, also in thickets and plains of the Pacific tierra caliente. A species of wide distribution. A shrub or small tree, usually a

shrub less than a meter high, the branches cylindric, densely pubescent; leaves petiolate, oblong or oval, obtuse or rounded at the apex, densely and softly pubescent; peduncles 1–3-flowered; fruits globose, 2.5 cm. in diameter. The fruits are rather acid, but of superior and agreeable flavor.

Psidium hypoglaucum Standl. Between Guachipelín and Volcán de La Vieja, *Brenes 15538*. Also in British Honduras. Plants low, simple, with acutely angulate branches; leaves short-petiolate, broadly obovate to rounded-oval, rounded and apiculate at the apex, rounded to acute at the base, green and sparsely pilose on the upper surface, pale beneath and very densely pilose with short, soft, gray hairs; fruits large, globose, yellow. The Costa Rican material, apparently exactly like the British Honduras type, indicates a remarkable range for the species, which, however, may be found ultimately in some of the intervening regions that might be suitable for its growth.

Psidium Oerstedeanum Berg, Linnaea 27: 360. 1854. Guanacaste and Bahía de Salinas. Ranging to Mexico. A shrub less than a meter high; leaves small, less than 6 cm. long, sessile or nearly so, oval or ovate, acute to rounded at the apex, rounded or somewhat cordate at the base, usually white-tomentose beneath but sometimes almost glabrous; peduncles 1-flowered; fruits small, rather sweet, very agreeably flavored.

Psidium Rensonianum Standl. Vicinity of San José; Villa Colón. Salvador. A shrub or small tree; leaves short-petiolate, oval to obovate, 7–15 cm. long, rounded or very obtuse at the apex, somewhat narrowed to the base, pale beneath and minutely sericeous; peduncles usually 3-flowered; fruits oval, about 2 cm. long.

Psidium Sartorianum (Berg) Niedenzu. Region of San Ramón. Ranging to Mexico. A large shrub or small tree with dark gray, smooth bark; leaves short-petiolate, ovate or broadly ovate, acuminate or abruptly acuminate, obtuse or acute at the base, 1.5–4 cm. long, glabrous, the lateral nerves obsolete or nearly so; peduncles axillary, 1-flowered, the buds glabrous; fruit globose, 12–20 mm. in diameter. The fruit is said to be juicy, with a rich, spicy, subacid flavor.

Psidium savannarum Donn. Smith, Bot. Gaz. 23: 244. 1897. *Güisaro dulce, Guayabillo.* Sabanas de Buenos Aires, *Tonduz 4033*. Reported from the Diquís Valley and from Térraba. Endemic. A

small shrub, the branches terete; leaves sessile, obovate, 2–2.5 cm. long, obtuse, somewhat narrowed toward the base, tomentose above, white-tomentose beneath; peduncles 1-flowered. The fruits are sweet. I have seen no material of this species, which I suspect may not be different from *P. Oerstedeanum*. Pittier reports the following indigenous names: Surú (Bribrí); Tush-bó (Térraba).

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